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THE IRON TRADE REVIEW

A Weekly Journal Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.

VOLUME XXXVII CLEVELAND, OHIO, NOVEMBER 10, 1904 NUMBER 45

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THE IRON TRADE REVIEW

VOLUME XXXVII CLEVELAND, OHIO, NOVEMBER 10, 1904 NUMBER 45

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The pig iron market has continued to advance in the past week, and the attitude of sellers is now such as to indicate a belief that the situation will be largely in their hands in the immediate future. At the same time the steel market has strengthened, rather as a result of the sensational advance in iron, than because of actual demand for steel. In finished material, while there is none of the excitement that has marked the pig iron advance, there is a broadening demand, and iron and steel manufacturers find indications of early buying of considerable proportions under the leadership of the railroads. The surprises of the sweeping election result were all on the side of an expansive movement in iron and steel and the feeling on the day after is of the most buoyant and hopeful character.

Foundry pig iron buying has continued, even under advancing prices, but has been of smaller proportions than in the two or three weeks preceding. Bessemer iron has taken the lead, one interest buying 25,000 tons from Buffalo furnaces, while the merchant furnaces of the Mahoning and Shenango Valleys have made sales that will fill their books for the greater part of the first quarter of 1905. Much of this iron has sold at $13.50 at the furnace and producers are now holding for $14.50. Basic iron has also made a sharp advance. There is naturally some irregularity in the pig iron market under the unusual developments of the past fortnight, and asking prices differ by 50 cents to $1. Northern No. 2 foundry has advanced to $14.50 at Central Western furnaces and in a good many cases $15 is now asked for first quarter delivery. Southern irons have sold in the week at $12.50, $12.75 and $13 for delivery in the first quarter of 1905. Evidence of increasing consumption accumulates, but there is also prominent the desire to cover before further advances are scored. Buyers are not all alike in this, and it is evident that a considerable number, believing the advance has been too rapid, are content to await more light before buying to any great extent for requirements beyond Jan. 1. The other view is that the conditions respecting ore and coke supplies are not such as to promise the increase in production that might have been readily predicted two months ago as an accompaniment of an advance of $2 to $2.50 in pig iron. Much turns on the coke situation, and thus far developments have indicated the continuance of a firm market. The advance in furnace coke has been 50 cents in the past two months and to late comers into the ore market the small lots they have been able to secure of standard ores have meant 35 to 50 cents more per ton.

There is a feeling that the measure of actual consumptive requirements should be better gauged before further extensive buying of pig iron, and the course of the finished material market in the next month will be watched narrowly as pointing to the effect of the election result upon industrial operations. Already steel manufacturers are asking a premium of 50 cents on billets, and talk is renewed of an early advance in the official price, though no meeting has been called. The rail price for 1905 is also expected to be settled in the near future, and there are predictions that pool prices on leading finished forms will be up for action before the close of the year.

Plate and structural mills have added a considerable amount to their tonnage in the past week, the structural demand being largely from railroads. Further orders both for steel and wooden cars point to the larger part railroads are taking in all markets and good employment for plate and shape mills through the winter is practically assured. Bars are stronger in Western markets, with a slight advance in steel bars asked by one important producer. Sheets show better buying and for deliveries in 1905 an advance of $3 a ton has been secured.

There is good ground apparently for the report of daily average bookings close to 30,000 tons, by Steel Corporation companies recently. But there is still room for expansion in production of finished material, as well as of steel and pig iron, on the part of the Steel Corporation and the season of lessened consumption is at hand. What buyers may do by coming into the market at one time to replenish stocks is an important consideration.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, Nov 9.

Sensational advances continue in the pig iron market, and the ease with which these have been made during the week indicate that the situation is largely in control of the furnace operators. The sales during the week in this district have not been heavy, but every inquiry brings out a higher quotation, and many believe that the high point has nearly been reached and that a break will soon occur. In two months the prices of various grades have been advanced practically $3 a ton and operators are talking of still higher prices. The improvement in crude material is not in line with the condition of the market in finished lines and steel manufacturers look with surprise on the constantly advancing iron market. The status of the billet and sheet bar market is by no means the result of heavy buying; but with Bessemer iron quoted at $15.10 to $15.35 Pittsburg, the steel producers consider it folly to maintain a basis of $19.50 for billets, and are asking premiums of 50 cents to $1 a ton. One prominent independent producer has withdrawn from the market entirely until the situation clears, while the remaining association steel producers have decided not to sell at agreed prices. On the other hand they are in no hurry to call a meeting to advance prices, contrary reports notwithstanding, and are anxiously waiting to learn the outcome of the present boom. We note the sale of 2,000 tons of basic for future delivery at $14.85 Pittsburg, and since this sale was made quotations have been advanced from 25 to 50 cents a ton. No. 2 foundry iron is held at $14.50 at the Valley furnace, while quotations on Bessemer iron range from $14 to $14.50 at the furnace. One sale of 3,000 tons of forge iron is reported at $14.10 Pittsburg, and since this sale was reported furnaces are asking $14.50 to $14.75. For future

delivery Southern operators are quoting $13 Birmingham for No. 2, while for early shipment $12.50 is secured.

The Lackawanna Steel Co. has purchased 15,000 tons of Bessemer for delivery this year from furnaces at Buffalo. Whether additional iron will be purchased cannot be learned. The price paid for this iron is under the delivered price quoted by Valley furnaces.

While it is true that the bulk of the iron purchased in the last two months is to cover contracts, many consumers are now entering the market, though with little business on their books, in their anxiety to cover lest prices go still higher. The advance in coke has had something to do with the straightening of the iron situation, and the present shortage of water in the Connellsville region, resulting in the shutting down of numerous coking operations, has advanced the price of spot coke. A few furnace operators have had to pay high prices for their coke supply until the end of the year for this reason, one furnace covering at $2. But this condition is abnormal and output of the region will increase as soon as the weather conditions change.

In finished lines there is little out of the ordinary to report. Some business in structural material is being closed, while the plate mills are still waiting for specifications for plates for the large steel car and ship orders recently placed. That the mills will be busy throughout the winter months is certain, but at present they are not rushed to fill orders. This week the Pittsburg, Bessemer & Lake Erie railroad placed an order for 1,000 steel cars and ten locomotives for delivery next spring, the steel car order requiring 10,000 tons of plates. The sheet market continues firm but prices are unchanged for prompt shipment. For delivery next year contracts are being closed at an advance of $3 a ton. The demand for iron and steel bars is not extraordinary, and the advance in iron bars is almost entirely due to the advance in forge iron. Demand for wire products continues good, and jobbers are loading their warehouses at the low prices that are prevailing, anticipating a large trade in the early part of next year. Demand for pipe has improved wonderfully, and another advance is looked for by the trade.

The output of standard section rails this year promises to exceed all predictions and it is reported will be close to 2,500,000 tons. Light rail manufacturers operating re-rolling mills have not met with much success in their efforts to boom prices, but they have succeeded in advancing their raw material, railroads and dealers now asking $14 for rerolling rails.

In preparing itself for an improved domestic demand after the first of the year the United States Steel Corporation is no longer accepting export contracts for billets and bars for farther future delivery. While prices have improved somewhat abroad they do not net the corporation more than $15 Pittsburg, and no more business on this basis is desired for the present at least.

Pig Iron.—The recent advances in pig iron exceed those of any like period in recent years, and are either the forerunner of a still greater improvement in the iron and steel trade or the result of another sporadic boom through which the industry has passed on several occasions this year. Few have the courage to predict the outcome of the furnace operators' efforts a week in advance, and as they apparently control the situation at present the future rests largely with them. Advances of 50 cents a ton have been made on successive inquiries during the week and a few operators predict $18 Bessemer before the first of the year. We note the sale of 2,000 tons of basic at $14 at the furnace for future delivery, but since this sale was made the price has been advanced 25 cents a ton. Bessemer is held at prices ranging from $14 to $14.50 furnace, and No. 2 foundry is firm at $15.35 Pittsburg. During the month of October there was little change in active capacity among the furnaces tributary to the Lake Superior ore region. Out of a total of 177 reporting, 131 were in blast with a daily capacity of 41,515 tons, while the capacity of the idle stacks is 13,225 tons. The active capacity on Nov. 1 was 75 percent, as compared with 74 percent the previous month. We revise quotations as follows:

Bessemer, Valley	$14 00 to 14 50
Bessemer, Pittsburg	14 85 to 15 35
No. 1 Foundry	15 50 to 16 00
No. 2 Foundry	15 10 to 15 35
Gray Forge, Pittsburg	14 50 to 14 75
Basic, Valley	14 00 to 14 50
Basic, Pittsburg	14 85 to 15 35

Steel.—By agreement, members of the billet association have withdrawn official quotations and are asking premiums of 50 cents to $1 a ton on material for prompt shipment. One independent producer in this district will not accept orders at present and is waiting for the situation to clear. None of the steel producers will take business at present prices for delivery after the first of the year. The strength of this market is not attributable to any great increase in demand but to the advances in Bessemer iron, the spread between the two now being slightly over $5 a ton. No meeting of the steel producers has been called nor will one be held until the outcome of the present movement can be more clearly ascertained. Agreed quotations are as follows: Bessemer and open-hearth billets, 4 x 4 in., and slabs, up to and including 0.25 carbon, $19.50 f. o. b. mill, Pittsburg, with actual freight added to point of delivery; 0.26 and including 0.60 carbon, $1 advance; 0.61 to 1.00 carbon, $2 advance. Billets smaller than 4 x 4 in., $2 advance; sheet and tin bars, $2 advance. Bessemer and open-hearth rods are held at $25 to $25.50.

Ferro-Manganese.—We quote domestic ferro at $41 to $42, delivered in carload lots and over at buyer's mill, at any point east of the Mississippi.

Spelter.—The market is strong, and prime Western grades are held at 5.35c, Pittsburg, in carload lots.

Muck Bar.—The advancing forge iron market has resulted in better prices for muck iron, which is held at $26 to $26.25 Pittsburg.

Skelp.—Most of the skelp mills are in full operation on orders placed some time ago. There is some inquiry for skelp for next year's delivery but little business has yet been placed. We quote grooved steel skelp at 1.30c to 1.35c Pittsburg, and sheared at 1.40c to 1.45c. Sheared iron is held at 1.50c to 1.55c and grooved at 1.45c.

Rails and Track Material.—While no new business is being placed with the rail mills for delivery this year, most of the mills continue in full operation. The efforts of the rerolling mills producing light rails to boom the market has met with little success. Prices have not advanced materially, while the cost of the raw material has been marked up from $2 to $3 a ton. Twenty-five to 40-lb. sections are selling at $20, while 12-lb. sections are offered as low as $22.50. We revise quotations as follows: Standard sections, 50 lb. and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots, $32; light rails, 12 lb., $22.50; 16 to 20 lb., $21 to $21.50; 25 to 45 lb., $20. Spikes, 1.55c to 1.60c.

Plates.—The Pittsburg, Bessemer & Lake Erie railroad placed an order this week for 1,000 steel cars and ten locomotives. To erect the cars 10,000 tons of plates will be required. Specifications have not yet come forward for the plates for the car and ship orders recently placed, although this large tonnage insures full operation throughout the winter months. There is little general buying. We repeat quotations as follows: Tank plates, ¼ in. thick, 6¼ to 24 in., inclusive, 1.30c f. o. b. mill, Pittsburg; over 24 in. up to 100 in., 1.40c. Extras are as follows per pound: Flange and boiler steel, 10c; marine, A. B. M. A., and ordinary fire box, 20c; still bottom, 30c; locomotive fire box, 50c; plates over 100 in. up to 110 in. in width, not less than 5c per 100 lbs. extra; plates 110 in. to 115 in. wide, not less than 10c extra; 115 to

120 in., 15c extra; plates 120 in. to 125 in. wide, not less than 25c extra; plates 125 in. to 130 in., not less than 50c extra; plates 130 in. wide, not less than $1 extra; plates 3-16 in. thick, $2 extra; gauges 7 and 8, $3 extra; No. 9, $5 extra. Five cents extra for less than carloads. Terms net cash in 30 days, and for all points of delivery in the United States except the Pacific Coast.

Structural Material.—The business closed by the mills is chiefly from railroads and little on building account is expected at this season of the year. Quotations are unchanged as follows: Beams and channels up to 15 in., 1.40c; over 15 in., 1.50c; angles, 3 x 2 up to 6 x 6, 1.40c; zees, 1.40c; tees, 1.45c; angles, from 3 to 16 in., 1.40c; universal and sheared plates, 6¼ to 24 in., inclusive, 1.30c; over 24 in., 1.40c base.

Bars.—Demand for iron and steel bars is good but not extraordinary, the recent advance in bar iron being almost entirely due to the advance in raw material. We make the following quotations: Bar iron, 1.35c to 1.40c Pittsburg; hoops, 1.55c, and bands, 1.30c, both taking bar extras. Bessemer and open-hearth steel bars, 1.30c; plow and cultivator beams, 1.30c, net; channels, angles, zees and tees, under 3 in., 1.40c. The following differentials are maintained on steel: Less than 2,000 lb. of a size and not less than 1,000 lb., 10 cents advance; less than 1,000 lb. of a size, 30 cents advance.

Pipes and Tubes.—The recent advance in pipe has resulted in considerable heavy business and the trade is looking for another advance later in the month. Discounts to consumers, carload lots, f. o. b. Pittsburg, plus freight to destination according to Tube Rate Book, are as follows:

MERCHANT PIPE.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
⅛ and ¼ inch	69	53	67	51
⅜ to 6 inches	77	67	75½	65½
⅜ and ½ inch	73	61	71	59
7 to 12 inches	72	57	70½	55
Extra Strong Plain Ends.				
⅛ to ⅜ inch	62	50	60	48
½ to 4 inches	69	57	67	55
4½ to 8 inches	65	53	63	51
Double extra strong plain ends, ½ to 8 inches	58	47	56	45

MERCHANT BOILER TUBES, LESS CARLOADS, 22 FEET AND UNDER.

	Steel.	Iron.
1 to 1½ inches	48	43
1¾ to 2¼ inches	60	43
2½ inches	62	48
2¾ to 5 inches	68	55
6 to 13 inches	60	43

Sheets.—The sheet market continues firm, but for prompt delivery quotations are unchanged. For delivery next year one contract was closed at an advance of $3 a ton. We quote black sheets, one pass through cold rolls in lots of 500 bundles and over as follows: No. 8, 1.60c; No. 9, 1.65c; Nos. 12 to 14, 1.70c; Nos. 15-17, 1.75c to 1.80c; Nos. 18-21, 1.85c to 1.90c; Nos. 22-24, 1.95c; Nos. 25-26, 2c; No. 27, 2.05c; No. 28, 2.10c to 2.15c; No. 29, 2.35c to 2.40c; No. 30, 2.50c to 2.55c. Galvanized: Nos. 12-17, 2.20c to 2.25c; Nos. 18-21, 2.35c to 2.40c; Nos. 22-24, 2.50c to 2.55c; Nos. 25-26, 2.65c to 2.70c; No. 27, 2.90c; No. 28, 3.10c; No. 29, 3.45c to 3.50c; No. 30, 3.85c to 3.90c.

Wire and Wire Nails.—Jobbers are taking advantage of the present low prices and are filling their warehouses. Quotations are unchanged as follows: Wire nails, jobbers' carload lots, $1.60; retailers' carloads, $1.65, and less than carloads, $1.75; printed barb wire, $1.75 to jobbers in carloads; retailers' carloads, $1.80, and less than carloads, $1.90, with 30 cents for galvanizing. Annealed smooth fence wire is held at $1.45, with the usual differentials to retailers for carloads and less than carloads. Quotations are all f. o. b. Pittsburg, 60 days, with 2 percent discount for cash in ten days. Iron and steel cut nails are held at $1.65 to $1.70.

Merchant Steel.—The demand for high grade steel continues to show some improvement, although there is little buying for future requirements. The shafting market is quiet. We quote: Toe calk, 1.90c; carriage spring steel, 1.75c; tire steel, 1.50c to 1.55c; plow steel, 6 in. and under, 1.35c for Bessemer and open-hearth; plow slabs, ¼ in. and heavier, 1.60c. Drawn and cold rolled shafting is held at 52 percent off in carload lots and 47 off in less than carload lots.

Old Material.—The market continues to advance in sympathy with pig iron, but the buying is not heavy, and thousands of tons are piled in the yards of the dealers and railroads. We revise quotations, gross tons, as follows: Heavy melting stock, $14 to $14.25; low phosphorus, $17.50 to $17.75; rerolling rails, $13.75 to $14; sheet scrap, $12 to $12.25; No. 1 cast, $11.75 to $12; No. 1 wrought, $13 to $13.50; and cast iron borings, $7.50 to $8.

Coke.—Coke prices continue to advance, and while most of the contracts for furnace coke requirements for the first half of next year have already been closed, some business is still under negotiation. One contract for furnace coke is reported on the basis of $1.90 for the first half of the year, although most of the furnace operators were able to close earlier at prices ranging from $1.60 to $1.70. There is an improvement in the demand for foundry coke for next year and prices range from $2 to $2.50, according to quality. Furnace coke for shipment to the end of the year is scarce, one order having been placed at $2. The shortage of water continues to interfere with operations in the Connellsville region and many ovens are in idleness. During the week ending Oct. 29 the production of the upper region was 196,189 tons and the lower region produced 61,574 tons.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1164 MONADNOCK BLOCK, Nov. 8.

The pressure that has been felt by the local selling interests in the past week has forced several out of the market and compelled others to advance their prices. All materials have shared in the buying movement in the week past, with the possible exception of heavy rails, but in general the movement in finished material has been quite secondary to that in pig iron. In the latter there is an advance of 50 cents a ton, Southern No. 2 foundry now selling on the basis of $12.50 Birmingham for this year's delivery, and $13 for shipment in the first quarter of 1905. Northern furnaces are asking $15.50 Chicago for No. 2 for delivery in November and December, and 50 cents a ton higher for shipments in the new year. Coke is generally 25 cents a ton higher than a week ago, both Southern and Connellsville producers having advanced their quotations. The advance of $2 a ton in merchant pipe announced last week makes a total of $4 a ton since Oct. 19. Producers of cast iron pipe, in view of the rise in pig iron, have advanced their prices $1 a ton and are now asking $26.50 Chicago for carload lots of 4-inch water pipe. Premiums of $2 a ton are asked by several large makers of soft steel bars for prompt shipment, while the leading manufacturer of bar iron has raised its price $1 a ton and is selling only to a selected list of customers. No diminution is noted in the demand for wire products, and an early advance in nails and fencing is looked for. Plates and structural shapes are extremely firm, several large orders for both products having been placed with leading interests in the last few days. Billets are strong, and in some quarters premiums are asked for prompt shipment. Old materials continue in their march upward, and advances averaging $1 a ton have been made in the entire list. Light rails remain firm and in good demand, producers getting prices $1 a ton better than a few weeks ago.

Pig Iron.—The Presidential election seems not to have affected the pig iron situation an iota, if the volume of orders and inquiries in the past week is any criterion. In this respect, the month of November has opened up in a manner contrary to expectations, the general belief being that a lull would be felt during the month on account of the election.

The haste of consumers to get under cover has forced prices up 50 cents a ton. Southern No. 2 foundry iron produced in Alabama and Tennessee is now selling on the basis of $12.50 Birmingham, or $16.15 Chicago; and Northern No. 2 foundry, at $15.50 Chicago; producers in both sections asking 50 cents a ton higher for deliveries in the first quarter of the new year. Virginia and Kentucky furnaces, excepting the Watts and Bristol stacks, are quoting No. 2 foundry at $13.25 furnace, the equivalent of $12.25 Birmingham, or $15.90 Chicago, giving deliveries either in 1904 or early 1905 at this price. It is becoming more difficult to get iron for prompt shipment, the situation being such as to warrant producers in taking care only of their regular customers. Several of the leading interests have withdrawn from the market absolutely for this year, and a number of them are declining to quote at the present time on deliveries for 1905. Northern Scotch foundry has advanced $1 a ton, and silvery irons are also $1 a ton higher than a week ago. Malleable Bessemer is firm at $16 Chicago, and basic iron at $16.65. There has been a fair tonnage of the latter grade sold in the week past, and little if any more is to be obtained for this year's consumption. We have revised our prices, and quote as follows:

Lake Superior Charcoal	$16 00 to 16 50
Northern Coke Foundry No. 1	16 00 to 16 50
Northern Coke Foundry No. 2	15 50 to 16 00
Northern Coke Foundry No. 3	15 00 to 15 50
Northern Scotch Foundry	16 50 to 17 00
Ohio Strong Softeners No. 1	17 80 to 18 30
Ohio Strong Softeners No. 2	17 30 to 17 80
Southern Coke Foundry No. 1	16 65 to 17 15
Southern Coke Foundry No. 2	16 15 to 16 65
Southern Coke Foundry No. 3	15 65 to 16 15
Southern Coke Foundry No. 4	15 40 to 15 90
Southern No. 1 Soft	16 65 to 17 15
Southern No. 2 Soft	16 15 to 16 65
Southern Gray Forge	15 15 to 15 65
Southern Mottled	15 15 to 15 65
Southern Silveries (1% to 6% Silicon)	17 40 to 18 40
Jackson Co. Silveries (6% to 8%)	19 30 to 20 30
Jackson Co. Silveries (8% to 10% Silicon)	20 30 to 21 30
Alabama and Georgia Car Wheel	18 65 to 19 15
Malleable Bessemer	16 00 to 16 50
Basic Iron	16 65

Billets.—Forging billets continue to be in good demand, premiums being asked by some interests for prompt shipment. Official prices are without change, and we quote Chicago deliveries on forging billets, 4 x 4 and larger, up to but not including 10 x 10, $24.50. Rerolling billets, Bessemer or open-hearth, 4 x 4 and larger up to .25 carbon, $22.50; up to and including .60 carbon, $1 extra. Billets, 3⅞ in. and smaller, and sheet and tin bars, $24.50. Wire rods, $26 Pittsburg.

Bars.—The demand for soft steel bars has been so heavy in the last few weeks as to result in an unofficial advance on the part of several producers of $2 a ton, making the Pittsburg price 1.40c, or 1.56½c Chicago delivery. The pool price is unchanged and is expected to remain so, the $2 extra being asked in the form of a premium by those mills whose books are overloaded with business. The aggregate tonnage placed with mills in the week past, including specifications and new business, is of very large proportions. Bar iron has strengthened in sympathy with the improved sentiment in scrap, pig iron and steel bars, and now no lower price can be obtained in this market than 1.45c Chicago. Some interests are asking 1.50c for prompt shipment, and it is expected the latter price will be general before the week is ended. The local situation is one of marked strength, mills declining to make quotations unless they know the exact tonnage and delivery required, and then the order is considered solely on its merits. We quote prices for Chicago delivery, mill shipments, as follows: Bar iron, 1.45c to 1.50c; soft steel bars, 1.46½c to 1.56½c; soft steel angles, less than 3 x 3, 1.56½c; hoops, 1.71½c rates, full extras. Local jobbers quote iron, 1.70c to 1.75c, base, full extras; hoops, 2c to 2.10c rates, full extras.

Sheets.—Sheets have shared in the general improvement of the finished material market, and mills and jobbers have booked a round tonnage in the week past. While some interests have advanced their prices and others withdrawn from the market until better prices can be realized, it is still possible to buy at the following quotations, which are given on carload lots, mill shipments, Chicago delivery: Nos. 9 and 10, 1.71½c to 1.76½; Nos. 11 and 12, 1.76½c to 18½c; Nos. 13 and 14, 1.81½c to 1.86½c; Nos. 15 and 16, 1.91½c to 1.96½c. On box annealed, one pass, cold rolled: Nos. 18 and 20, 2.01½c to 2.06½c; Nos. 22 and 24, 2.06½c to 2.11½c; Nos. 25 and 26, 2.11½c to 2.16½c; No. 27, 2.16½c to 2.21½c; No. 28, 2.26½c to 2.31½c; No. 29, 2.41½c to 2.46½c; No. 30, 2.51½c to 2.56½c. We quote lots from jobbers' stocks as follows: No. 10, 1.90c to 2c; No. 12, 1.95c to 2.05c; No. 14, 2c to 2.10c; No. 16, 2.10c to 2.20c; No. 18, 2.20c to 2.30c; No. 20, 2.25c to 2.35c; No. 22, 2.30c to 2.40c; No. 24, 2.35c to 2.45c; No. 26, 2.40c to 2.50c; No. 27, 2.50c to 2.60c; No. 28, 2.60c to 2.70c; No. 29, 2.70c to 2.80c. Galvanized sheets are fair and prices steady. We quote Pittsburg discounts, f. o. b. mill, 80 and 5 to 80 and 10. For shipments from stock, we quote heavy gauges and wide widths, 75 to 5 to 75 and 10 percent; for light gauges, 75, 10 and 7½ percent to 80 percent.

Structural Steel.—A round tonnage, running into nearly six figures, is the volume of business booked by the leading interest in the week under review. Other producers report a heavy week, contracts and specifications having been placed with freedom since our last report. All of this material is for general building work and stock purposes. Only one of the contracts for the large buildings which are to be erected in this city in the near future has been let. This is for the Majestic Theatre, the contract calling for 2,800 tons of shapes. McClintic-Marshall Co., of Pittsburg, will do the fabricating. Prices are very firm, and the cutting on structural angles has to a large extent been done away with. We quote mill prices, carload lots, Chicago delivery, as follows: Beams and channels, 3 to 15 in. inclusive, 1.56½c; angles, 3 to 6 in., ¼-in. and heavier, 1.56½c; angles, larger than 6 in. on one or both legs, 1.66½c; beams, larger than 15 in., 1.66½c; zees, 3-in. and over, 1.56½c; tees, 3-in. and over, 1.61½c, with the usual extras for cutting to exact lengths, punching, coping, bending or other shop work. Store prices on structural materials are 1.80c to 1.90c for angles, beams, channels, base sizes, with 1.90c to 2c for 18, 20 and 24-in. beams; tees and zees, 1.85c to 1.95c. These prices are for either random lengths or cut to lengths.

Plates.—The shipbuilding and railroad interests have been heavy buyers of plates from local producers, and the situation is considered much improved in consequence. General buying is of fair proportions, though this product is still entitled to be considered the weakest sister on the list. We quote official prices, with the reservation that some outside mills are shading same, on carload lots, Chicago delivery, as follows: Tank steel, ¼-in. and heavier, 24-in. wide and under, rectangular plates only, 1.46½c base; over 24-in. to 100-in. wide, 1.56½c base; flange steel, 1.66½c base; marine steel, 1.76½c base, all full extras. Plates, 3-16 in. thick, $2 extra; gauges, 7 to 8, $3 extra; No. 9, $5 extra. Less than carload lots, 5c extra. Prices from store are as follows: Tank steel, ¼ in. and heavier, 1.80c to 1.90c; 3-16, 1.90c to 2c; No. 8, 1.90c to 2c; flange steel, 2.05c to 2.15c.

Rails and Track Supplies.—No diminution is to to be noted in the demand for either light rails or track supplies, a good round tonnage having been booked in both products in the past seven days. Light rails are higher in price than they have been at any time this year, and have a strongly advancing tendency. Standard sections are quiet. We quote as follows: Heavy sections, 500 tons and over, $28; less than 500 tons to carload lots, $30; less than carload lots, $32; second quality rails, $27; light rails, $21 to $23; track supplies, f. o. b. Joliet mill, angle bars, 1.30c; spikes, first quality, 1.60c to 1.65c; track bolts, 3¼ x ¾, with square nuts, 2.25c to 2.30c per 100 lb.; with hexagon nuts, 2.40c to 2.45c.

Merchant Steel.—An active week is reported by producers,

who assert that both specifications and new business continue of heavy volume. Prices are unchanged, and we quote mill shipments, Chicago delivery, as follows: Spring steel, 1.85c; sleigh shoe, flat sizes, 1.51½c; concave and convex, 1.60½c to 1.71½c; cutter shoe, 2.25c; smooth finished machinery steel, 1.71½c; smooth finished tire, 1.66½c; plow steel, 2.20c and upwards, according to quality; toe calk steel, 2.01½c; crucible tool steel, 6½c to 8c; special grades of tool steel, 13c and up; cold rolled shafting, 52 percent from list in carload lots, and 47 percent discount in less than carload lots.

Merchant Pipe.—A further advance of $2 a ton has been made in merchant pipe, the change applying to both black and galvanized steel and iron pipe. Business is of active proportions, mills suffering from no lack of specifications. We have revised our prices, and quote on carload lots, mill shipments, random lengths, f. o. b. Chicago, as follows:

MERCHANT PIPE.

	Steel Pipe.		Guaranteed Wrought Iron Pipe.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛ and ¼ inches	70.35	54.35	68.35	52.35
⅜ and ½ inches	74.35	72.35	72.35	70.35
¾ to 6 inches	78.35	68.35	76.85	66.85
7 to 12 inches	73.35	57.35	71.85	56.85

Boiler Tubes.—A marked improvement is shown in the demand for this product. Prices are without change and we quote mill shipments, Chicago delivery, as follows:

BOILER TUBES.

	L. W. Steel. Percent.	C. C. Iron. Percent.	Seamless Steel. Percent.
1 to 1½ inch	46.35	41.35	52.35
1¾ to 2¼ inch	58.35	41.35	40.35
2½ inch	60.35	46.35	43.35
2¾ inch to 5 inch	66.35	53.35	{ Up to 4 inches.
6 to 13 inch	58.35	41.35	{ 50.85

The following are the agreed discounts from store:

	Steel.	Iron.	Seamless Steel.
1 to 1½ inches, inclusive	42½	37½	40
1¾ to 2¼ inches, inclusive	52½	35	37½
2½ inches, inclusive	55	37½	40
2¾ to 5 inches, inclusive	62½	47½	47½
6 inches and larger	52½	35	..

Cast Iron Pipe.—In view of the higher prices of pig iron, producers of pipe have been compelled to raise their prices $1 a ton, the new schedule going into effect last week. Some nice business has been closed since the publication of our last report, including a contract for 800 tons of pipe for the municipality of Barnesville, Ohio. Several other good sized lots are pending. We quote carload lots, Chicago delivery, as follows: Four-in. water pipe, $26.50; 6-in. and larger sizes, $25.50; gas pipe, $1 a ton higher.

Wire Products.—Mills continue to be swamped with orders for quick delivery, and are experiencing trouble in keeping pace with their business. Prices are very strong and an advance is looked for at an early date. We quote carload lots to jobbers, Chicago delivery, mill shipments, as follows: Wire nails, 1.75c; painted barb wire, 1.90c; galvanized barb wire, 2.20c; smooth annealed wire, 1.60c; smooth galvanized wire, 1.90c; polished staples, 1.85c; galvanized staples, 2.15c. Less than carload lots to jobbers are 5 cents higher than above prices. The retail trade is quoted 5 cents extra over the foregoing on carload lots, and 10c extra on less than carload lots. Bale ties are unchanged at 82½c and 5 percent discount f. o. b. Waukegan, Ill., on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet and DeKalb, with actual freight allowed not exceeding 50 cents per 100 pounds.

Foundry Coke.—Demand for coke has moved forward in sympathy with the operations in pig iron. Good 72-hour fuel, whether from Connellsville or Southern ovens, is not plentiful, and as a result of the scarcity and the general bullish sentiment in the iron and steel market, prices have moved upward. Connellsville, 72-hour grades, are firm at $2.25 ovens or $4.90 Chicago, and coke from Virginia and West Virginia from $1.90 to $2.15 ovens.

Old Material.—Further advances have been made in scrap, averaging about $1 a ton all through the list. Demand is not of heavy proportions, consumers buying only such as they actually need; but despite this weakness in consumptive inquiry, dealers find no difficulty in maintaining the prices given below. The only railroad list that has been in the market since our last report was that of the Illinois Central, offering about 4,000 tons for sale, and this was promptly bought up. We have revised our quotations, and quote selling prices, gross tons, as follows:

Old steel rails (4 feet and over)	$12 00 to 13 00
Old steel rails (less than 4 feet)	12 50 to 13 50
Relaying rails, subject to inspection	21 50 to 22 50
Relaying rails for sidetracks	19 00 to 20 00
Old wheels	13 00 to 13 50
Heavy melting steel	12 00 to 13 00
Mixed country steel	7 00 to 7 50
Low phosphorus scrap (.04 and under)	13 00 to 13 50

The following quotations are for net tons:

No. 1 R. R. wrought	13 00 to 14 00
No. 2 R. R. wrought	12 50 to 13 00
Shafting	12 50 to 13 00
Dealers' Forge, No. 1	10 00 to 10 50
Wrought pipe and flues	10 50 to 11 00
No. 1 cast, 150 lb. and less	12 50 to 13 00
No. 1 mill	6 00 to 6 50
Country sheet	5 00 to 5 50
No. 1 boilers, cut	10 50 to 11 00
Boiler punchings	10 50 to 11 00
Iron car axles	18 50 to 19 00
Steel car axles	13 50 to 14 00
Iron axle turnings	9 00 to 9 50
Steel axle turnings	9 00 to 9 50
Cast borings	5 50 to 6 00
Mixed borings, etc	5 50 to 6 00
Wrought turnings	8 50 to 9 00
Machine shop turnings	8 50 to 9 00
Railroad malleable	10 50 to 11 00
Agricultural malleable	10 00 to 10 50
Stove plate and light cast scrap	10 00 to 11 00
Old iron splice bars	13 50 to 14 50

CLEVELAND.

OFFICE OF *The Iron Trade Review*, 1064 ROSE BUILDING, Nov. 9.

October made an excellent record in ore shipments, the total being 4,034,721 tons against 3,006,857 tons in October, 1903, an increase of 1,027,864 tons, or 34 percent. The decrease for the season to Nov. 1 is now only 4,726,191 tons, or 21 percent, and, if favorable weather continues, this shortage will be considerably reduced. The October shipments by ports were:

	Oct. 1903.	Oct. 1904.
Escanaba	560,076	659,286
Gladstone	25,001	.....
Marquette	236,183	370,638
Ashland	363,342	470,505
Superior	527,710	799,221
Duluth	720,724	904,045
Two Harbors	575,821	831,026
	3,006,857	4,034,721

The shipments for the seasons to Nov. 1 were as follows:

	1903.	1904.
Escanaba	3,913,065	2,951,932
Gladstone	81,355	480
Marquette	1,885,879	1,548,682
Ashland	2,658,616	1,902,236
Superior	3,712,940	3,482,255
Duluth	5,183,163	3,945,051
Two Harbors	4,948,332	3,826,523
	22,383,350	17,657,159

The shipments for the first week of November have been vary large. Charters are being made this week at 75 cents from the head of the lakes, and 70 cents from Marquette, an advance for both ports of 5 cents over the rates which have been in force for a number of weeks. Shippers are not having any trouble in getting tonnage. Ore prices have been advanced 35 to 50 cents per ton and furnaces that have not covered their requirements are having much difficulty in findng enough ore to meet their needs. The ability of some

plants to operate till the opening of navigation next year will depend upon weather conditions on the lakes this month and next, as they will be short unless large shipments are made before the close of navigation. We revise prices as follows: Old range non-Bessemer, $2.85 to $3; old range Bessemer, $3.50 to $3.60; Mesabi non-Bessemer, $2.75 to $2.85; Mesabi Bessemer, $3 to $3.35.

Pig Iron.—The market is very strong and prices are still tending upward. The sale by a Cleveland firm of 25,000 tons of Bessemer to a large independent steel company and sales by the Bessemer Association have strengthened the Bessemer market very much and $14 is now the bottom price, while there are reports of sales at $14.50. Basic has sold at $14.25. For foundry iron, the one Cleveland company which has iron for the remainder of this year is selling No. 2 at $15 at the stack. The Valley price is $14.50 to $15. Charcoal iron has not advanced as rapidly as coke iron and sellers have had difficulty in getting $16 except in small lots. In the South, the usual quotation is $12, but sales have been made at $13 Birmingham for No. 2 for Southern delivery. On the other hand, a new furnace recently blown in and eager for business is reported to have sold at $11.75, but that was exceptional. The accumulation of a large stock held by one Southern company is a menace to the market, but it will be sold carefully and the chief danger seems to be in possible reduction of prices by furnaces which expect to come into blast at an early date. High prices are still being asked for coke, but the scarcity is not so pronounced as it was a week ago. We quote as follows for Cleveland delivery:

Bessemer	$14 85 to 15 00
No. 1 Strong Foundry	15 50 to 16 00
No. 2 Foundry	15 00 to 15 50
No. 3 Foundry	14 00 to 14 50
No. 2 Southern	15 85 to 16 35
Gray Forge	13 50 to 14 00
Gray Forge, Southern	14 00 to 14 50
Lake Superior charcoal	15 50 to 16 00

Finished Material.—The market is stronger and sellers are much more reluctant about making long time contracts, especially on bars and sheets, as higher prices are confidently expected. Steel bars at 1.39½c Cleveland for Bessemer and 1.44½c for open-hearth are even stronger than last week. The increased cost of scrap has added to the cost of open-hearth steel and made an increase of price at an early date very probable. Bar iron is somewhat irregular, but, on the whole, stronger. The usual price is 1.35c at the mill, but 1.40c has been paid on small orders. The improved demand for axles is an encouraging sign of the activity of railroads as buyers. The demand for shapes and plates is excellent. While the sheet business in Cleveland has not been as good as in other places, conditions are more favorable and the principal producer declines to make long time contracts. The prices of the principal producers through jobbers are as follows, Cleveland delivery, the freight from Pittsburg being 9½ cents: Mill sales of black sheets in carload lots, No. 10, 1.64½c; No. 11-12, 1.69½c; No. 14, 1.79½c; No. 16, 1.89½c; No. 27, 2.14½c; No. 28, 2.24½c. Galvanized, mill sales, No. 14, 2.24½c; No. 16, 2.34½c; No. 18-20, 2.49½c; No. 22-24, 2.64½c; No. 25-26, 2.84½c; No. 27, 3.04½c; No. 28, 3.24½c. Out of stock black sheets: ¼-in. 1.90c; 3-16-in., 2c. Blue annealed: No. 10, 2.05c; No. 12, 2.10c; No. 14, 2.15c; No. 16, 2.25c. One pass cold rolled: No. 18-20, 2.35c; No. 22-24, 2.40c; No. 26, 2.45c; No. 27, 2.50c; No. 28, 2.60c; No. 30, 3c. Galvanized out of stock: No. 16, 2.60c; No. 18-20, 2.70c; No. 22-24, 2.85c; No. 26, 3.05c; No. 27, 3.25c; No. 28, 3.45c; No. 30, 4.25c.

Old Material.—Prices are still advancing and the demand is strong. We quote as follows, gross tons, Cleveland:

Old iron rails	$18 50 to 19 50
Old steel rails (over 6 feet)	14 00 to 15 00
Old steel rails (under 6 feet)	14 00 to 15 00
Old car wheels	12 50 to 13 00
Steel boiler plate	9 50 to 10 50
Malleable iron (railroad)	12 50 to 13 00
Malleable iron (agricultural)	9 50 to 10 00
Heavy steel	13 50 to 14 00

We quote as follows, net tons:

No. 1 R. R. wrought	$13 00 to 13 50
No. 1 busheling	12 50 to 13 00
No. 1 machine cast	12 50 to 13 00
Iron axles	17 50 to 18 00
Axle turnings	9 00 to 10 00
Wrought turnings (free from cast)	8 00 to 8 50
Grate bars	8 00 to 8 50
Pipes and flues	10 00 to 10 50
Tank iron	10 00 to 10 50
Hoop and band iron	8 00 to 9 00
Sheet iron	6 00 to 7 00
Wrought drillings	8 00 to 8 50
Stove plate	8 00 to 9 00
Steel axles	16 00 to 17 00
Cast borings	5 25 to 5 75

CINCINNATI.

Nov. 8

The coke market is exceedingly strong, with foundry coke now quoted at $2.50 f. o. b. Connellsville and furnace coke at $2 f. o. b. ovens.

Pig Iron.—A further advance has been recorded during the week in both Northern and Southern iron. The bulk of the business done during the week under review was at $12 Birmingham for Southern iron and about $14 furnace for Northern brands. Sales were mainly for deliveries extending into the first quarter of 1905. In the aggregate a good tonnage was sold but no very large single transactions were reported. Today the ruling quotation on Southern brands is $12.50 for No. 2 foundry Birmingham, with Northern furnaces quoting $14.50 to $15 furnace. One Southern furnace interest having a freight rate differential of 25 cents a ton is offering at $12.50 furnace, which is equivalent to $12.25 Birmingham, and this price may be regarded as minimum. As the market advances there is some lessening of inquiry and a number of buyers who have covered their wants up to the first of the year maintain that they will not come into the market until these contracts run out. The whole situation is somewhat peculiar, as finished materials have not responded to the advance in pig iron, which has been unusually rapid. It was believed that an advancing market for pig iron would bring in increased furnace capacity in the South. It has developed, however, that the shortage in the coke supply was more serious than had been anticipated. Another feature in the situation is the probable serious lack of cars which would at best be embarrassing to furnaces buying coke from ovens at a distance, as there would be no certainty of a regular coke supply under shortage of railroad equipment. Some in the trade assert that the conditions are such that increased productive furnace capacity in the South cannot reasonably be expected this year. Should this view of the situation be correct the Southern iron market is apparently in a strong position, as a large number of consumers will undoubtedly come into the market about the first of the year. Current quotations f. o. b. Cincinnati are as follows:

Southern Foundry No. 1	$15 50 to 15 75
Southern Foundry No. 2	15 00 to 15 25
Southern Foundry No. 3	14 50 to 14 75
Southern Foundry No. 4	14 25 to 14 50
Southern Foundry No. 1 soft	15 50 to 15 75
Southern Foundry No. 2 soft	15 00 to 15 25
Gray Forge	14 00 to 14 25
Northern Foundry No. 1	16 15 to 16 65
Northern Foundry No. 2	15 65 to 16 15
Southern car wheel iron	18 00 to 18 50

Finished Material.—The market is firm and there is a strong tone to everything on the list. Bar iron still leads in the advance and is marked up again this week. Other items are firm but there is no advance in prices, although the leading interests are now refusing to book orders as far ahead as they were. The general trade is fairly good in a jobbing way. Bar iron is quoted at 1.45c to 1.48c; steel bars at 1.43c, half extras, with dealers quoting 1.60c to 1.75c for iron and steel out of store. Galvanized sheets are at 80 and 10 percent off. We quote black sheets, No. 27, at 2.25c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.60c; No. 27, 2.50c; No. 16, 2.10c; No. 14, 2c; No. 12, 1.95c; No. 10, 1.90c. Tank plates are dull and sell out of store at 1.85c for ¼-in. and

1.95c for 3-16-in., No. 8 and No. 10. Beams and channels are quoted at 1.85c from stock, and angles at 1.85c to 1.90c for base sizes.

In merchant pipe quotations are revised to conform to the advance made by the leading interest early in the week under review. The demand is showing improvement and the number of small orders to be taken care of is showing a good general consumption of this material. Car lots are quoted as follows, f. o. b. Cincinnati:

MERCHANT PIPE.
(Basing Discounts.)

	Steel Pipe.		Guaranteed Wrought Iron Pipe.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛ and ¼ inches	67.35	51.35	65.35	49.35
⅜ and ½ inches	71.35	59.35	69.35	57.35
¾ to 6 inches	75.35	65.35	73.85	63.85
7 to 12 inches	70.35	55.35	68.85	53.35

BOILER TUBES.

	Steel. Percent.	Iron. Percent.
to 1½ inch	41.2	37.7
1¾ to 2¼ inch	54.2	36.7
2½ inch	56.7	41.7
2¾ to 5 inch	63.2	49.2
6 to 13 inch	54.2	36.7

Old Material.—The market is firm and for some descriptions prices are higher. Stocks of scrap are firmly held and are difficult to buy at current prices. We quote:

Old No. 1 railroad wrought, net tons	$12 50 to 13 00
Cast machine and foundry, net tons	10 50 to 11 00
Old iron rails, gross tons	14 50 to 15 00
Old steel rails, gross tons	11 50 to 12 00
Old short lengths, gross tons	11 50 to 12 00
Old iron axles, net tons	16 50 to 17 00
Stove plate, net tons	8 00 to 8 50
Wrought turnings, net tons	7 50 to 8 00
Cast borings, net tons	5 50 to 6 00

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, No. 150 NASSAU ST., Nov. 8.

Pig Iron.—The local pig iron market developed great strength during the past week, and today the highest prices since the upward movement set in prevail. As a result Northern irons are almost on a parity with Southern brands, and at some seaboard points prices for both show practically no variation at all between the two sections. Southern irons have been especially firm. One of the largest Southern interests which has been out of the market for several weeks announced its willingness during the week to accept orders for No. 2 foundry on the basis of $12 Birmingham for delivery this year, and $13 for delivery the first quarter of next year. Of the former it says it has but very little to offer. There were only a few transactions closed during the week in Southern irons, consumers for the most part having already provided for their requirements for the remainder of the year. In fact, inquiries and sales made during the past few days have been for delivery the first quarter of next year, with many buyers disposed to await developments of the near future before contracting on any large scale for this delivery at present prices. This is because of the belief which prevails in some quarters that artificial conditions have had considerable to do with recent advances. In fact a "stand pat" policy has attractions for both producers and consumers nowadays. Inquiries in the market represent a goodly tonnage, one of them for 3,800 tons. New York quotations at tidewater, for delivery this year, follow: Northern No. 1 foundry, $15.75 to $16; No. 2 foundry, $15.25 to $15.50; No. 2 plain, $15 to $15.25; No. 1 Southern foundry, $16 to $16.25; No. 2 foundry, $15.50 to $15.75; No. 3 foundry, $15 to $15.25; No. 4 foundry, $14.50 to $14.75.

Finished Iron and Steel.—Developments during the week in structural shapes indicate some good orders in the near future. The most promising were the specifications from railroads which aggregated betwen 35,000 and 40,000 tons, and which encouraged the hope that the long belated buying from this source will soon materialize. There were no transactions of any magnitude closed during the week, current orders running to small lots. Plates continue to be in good demand, some concerns booking more orders several times over during the past two weeks than for any similar period during the present year. Bars maintain all the good features noted in previous reports, and sheets show evidences of considerable strength. New York prices at tidewater follow: Angles, 3 to 6 in. x ¼ in. and heavier, 1.54½c; beams, 3 to 15 in., 1.54½c; channels, 3 to 15 in., 1.54½c; beams, 18, 20 and 24 in., 1.64½c; tees, 3 x ¼ in. and heavier, 1.59¼c, plates, carloads, tank, 1.54½c; flange, 1.64½c; marine and ordinary fire box, 1.74½c; refined iron and soft steel bars, 1.44½c; sheets, in carload lots, New York, No. 28, black, 2.30c to 2.35c; galvanized, 3.30c to 3.35c.

Old Material.—Although transactions closed during the week were light, prices were decidedly firmer, with old rails the feature. Not without significance is the fact that those who have the largest stocks on hand, are more disposed to replenish than reduce them. The bullish feeling is very strong. We quote f. o. b. cars:

Old iron rails	$15 00 to 15 50
Old steel rails, long lengths	13 50 to 14 00
Old steel rails, short pieces	13 00 to 13 50
Relaying rails	19 00 to 20 00
Old car wheels	12 25 to 12 75
Old iron car axles	17 00 to 18 00
Old steel car axles	14 00 to 15 00
Heavy melting steel scrap	13 00 to 13 00
No. 1 railroad wrought scrap	13 50 to 14 00
Iron track scrap	12 00 to 12 50
Wrought pipe	9 50 to 10 00
Ordinary light iron	7 00 to 7 50
Cast borings	5 50 to 6 00
Wrought turnings	7 75 to 8 00
No. 1 machinery cast	11 50 to 11 75
Stove plate	9 00 to 9 50

BIRMINGHAM.

Nov. 7.

Alabama pig iron manufacturers have made sales of their product for early delivery, on the basis of $12.50 for No. 2 foundry, and $13 for delivery in the first quarter of next year. The opinion is expressed by prominent producers that $14 is an early probability for delivery during the second quarter of the coming year. The conditions are quite uneven, but with the market strongly favoring the furnaces. There is not a great amount of iron on hand for immediate delivery except in the hands of two companies, and the prospects as to increased production are not over bright. The United States Cast Iron Pipe Co. for its Bessemer, Ala., plant, has made a purchase of 1,000 tons of iron, delivery during this month, on a $12.50 basis for No. 2 foundry.

The production in this section has been improved a little by the blowing in of the Vanderbilt furnace of the Tutweiler Coal, Coke & Iron Co. This plant has a daily capacity of less than 150 tons. The Tennessee Coal, Iron & Railroad Co. has one furnace at Bessemer in operation and four at Ensley. The greater portion of the iron being manufactured at Ensley goes to the steel plant belonging to the same company. The production of steel at the Ensley plant is on the increase and it is officially stated that improvements will be made to bring the production up to about 20,000 tons per month. The demand for steel rails is steady.

The consumption of pig iron in Birmingham territory is steadily increasing. The cast iron pipe companies, the rolling mills, foundries and machine shops require more and more every month. The Birmingham Steel & Iron Co., which purchased the plant of the Hood Machine Co. a year or two since, adding a steel furnace in the foundry, has purchased the old Henderson steel plant at North Birmingham, which has been out of operation for several years, and will make an effort to revive it and manufacture steel for its own use and for the market. The plant needs more or less repairs.

Shipments of pig iron from this district are picking up. There is a large quantity of iron booked for shipment in the next few months.

The strike of the union coal miners is still on, with both sides claiming to be holding their own. The production of coal with non-union men at points where union miners before

had full sway is yet far from normal. The mines in Bibb county appear to be doing best with non-union men. Two of the larger companies have withdrawn their special deputies around their mines, indicating that there are no further fears of intimidation or interruption in the plans to operate the mines on "open shop" plan.

The following quotations for pig iron are made: No. 1 foundry, $13 to $13.50; No. 2 foundry, $12.50 to $13; No.3 foundry, $11.50 to $12; No. 4 foundry, $11.25 to $11.50; gray forge, $10.50 to $10.75; No. 1 soft, $13 to $13.50; No. 2 soft, $12.50 to $13.

PHILADELPHIA.

Nov. 7.

Improvement continues, with demand in all lines strong and prices being maintained as advanced. Most encouraging reports come from shipbuilding interests, and car and locomotive builders are receiving increased orders. Prices of coke have advanced and large orders, covering the first six months of 1905, have been placed. Railroads are being taxed to haul coke already sold.

Pig Iron.—There has been increased activity and buyers are willing to place orders for the first half of 1905 and in some cases for a year ahead. The market continues strong and heavy business is being done at advancing prices. We quote for Philadelphia and nearby deliveries as follows: No. 1 X foundry, $16 to 16.25; No. 2 X foundry, $16.50 to 15.75; No. 2 plain, $15.00 to 15.25; standard gray forge, $13.75 to 15.25; basic, $14 to 14.25; low phosphorus, $19.50 to 19.75.

Finished Material.—The demand for shapes has increased and the prospect for further improvement is excellent. There is good demand for iron and steel bars and it is expected that prices will advance. We quote as follows: Plates, 1.53½c to 1.47½c; beams, channels and angles, 1.53½c to 1.62c, according to specifications, and small angles, 1.50c to 1.55c; bars, 1.43½c for carload lots for either iron or steel and the usual advances on part carloads.

Old Material.—The scrap market is very irregular. There is much hesitation on the part of buyers owing to the high prices. We quote as follows: No. 1 steel scrap, $14 to 14.50; low phosphorus scrap, $17 to $17.50; old steel axles, $19.75 to $20; old iron rails, $17 to $17.50; old car axles, $17 to $17.50; old iron axles, $19.75 to $20; old iron rails, $17 to $17.50; old car wheels, $13 to $13.50; choice railroad No. 1 wrought, $16 to $16.50; machinery cast, $13 to $13.50; No. 2 light scrap (forge), $11 to $11.50; light scrap (ordinary), $9.50 to $10; wrought turnings, $10 to $10.50; cast borings, $7.25 to $7.50; stove plates, $10.50 to $10.75; wrought iron pipe, $12.25 to $12.75.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, NO. 150 NASSAU ST., Nov. 8.

Pig Tin.—Very little can be said of the market during the week except that it held the strength it developed a week ago, and prices today are practically the same as then. The London market has been strong also, with prices showing little change from those last quoted. Closing prices today follow: Spot, 28¾ to 29.00c; November, 28⅝ to 28⅞c; December, 28⅝ to 28¾c. London's closings today follow: Spot, £131 7s 6d; futures, £131. Arrivals at Atlantic ports for the month to date aggregate 585 tons, with 1,230 tons afloat.

Copper.—Because of favorable reports from the domestic trade, and the continued bright outlook for exports, asking prices were advanced an additional ⅛ cent by the leading producers. The London market during the week was exceptionally strong, closing at highest prices today. Closing prices today were as follows: Lake, 13⅞ to 14⅛c; electrolytic, 13⅞ to 14c; casting, 13⅝ to 13¾c. London's closings today follow: Spot, £63 13s; futures, £63 11s. Exports for the month to date amount to 3,278 tons.

Lead.—Demand is still brisk with prices higher at 4.45c to 4.50c. St. Louis is unchanged at 4.20c, and London is slightly firmer at £12 16s 3d.

Spelter.—Is moderately active and unchanged at 5.35c to 5.40c. St. Louis is stronger at 5.20c, and London advanced to £23 17s 6d.

Antimony.—Prices are decidedly higher than last week, Cookson's being 7.50c to 8.00c; Hallet's, 7.25c to 7.50c; and other grades at 7.00 to 7.50c.

Quicksilver.—We quote $40 per flask of 76½ lb. in lots of 100 flasks. London is £7 15s.

Nickel.—Sales are made at 40c to 47c for large lots down to a ton, and at 50c to 60c for small quantities.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1164 MONADNOCK BLOCK, Nov. 8.

Demand for metals in this market has been of fair proportions in the past week, and prices are very firm. We quote as follows: Lake copper in carloads, 14c, and for smaller lots, 14¼c; casting, 13⅞c for coarloads, and 14¼c for lesser quantities. Pig tin, carloads, 29¾c, and 30¼c to 30½c for less than carload lots. Spelter is unchanged at 5¼c to 5½c, according to quantity. Sheet zinc, 6c for carload lots of 600-lb. casks, and 6.25c to 6.30c for less than carload lots. Pig lead, 4.30c for 50-ton lots; 4.35c for carload lots, and 4.50c for smaller lots.

Old metals have been influenced by the strength of scrap iron and steel, and prices have an advancing tendency. We quote copper wire and heavy, 11½c; copper bottoms, 10¼c; copper clips, 11c; red brass, 10¼c; red brass borings, 8c; yellow brass, heavy, 7½c; yellow brass borings, 6½c; light brass, 6c; tea lead, 4c; zinc, 3.65c.

New Records in the Pittsburg District.

The rod rolling record held by the Rankin plant of the American Steel & Wire Co., Rankin, Pa., for one month's output was broken during the month of October by the Monessen, Pa., plant of the Pittsburg Steel Co. The world's record established by the Rankin plant was 11,500 tons, but the Monessen plant produced 11,664 tons, breaking this record by 164 tons.

New ore unloading records are being established at the Rankin and Duquesne plants of the Carnegie Steel Co., Pittsburg. During a period of 95 hours recently ten laborers, two bridge workers and one car tipple employe unloaded 1,780 cars of ore containing from 40 to 45 tons each. This was an average of more than 18 cars an hour. Automatic car unloaders were used in making this big record.

During the month of October the blooming and plate mills of the Wheeling, W. Va., plant of the National Tube Co., Pittsburg, broke all previous records by 600 tons. F. H. Crockard, manager of the plant, gave the customary banquet in honor of the occasion.

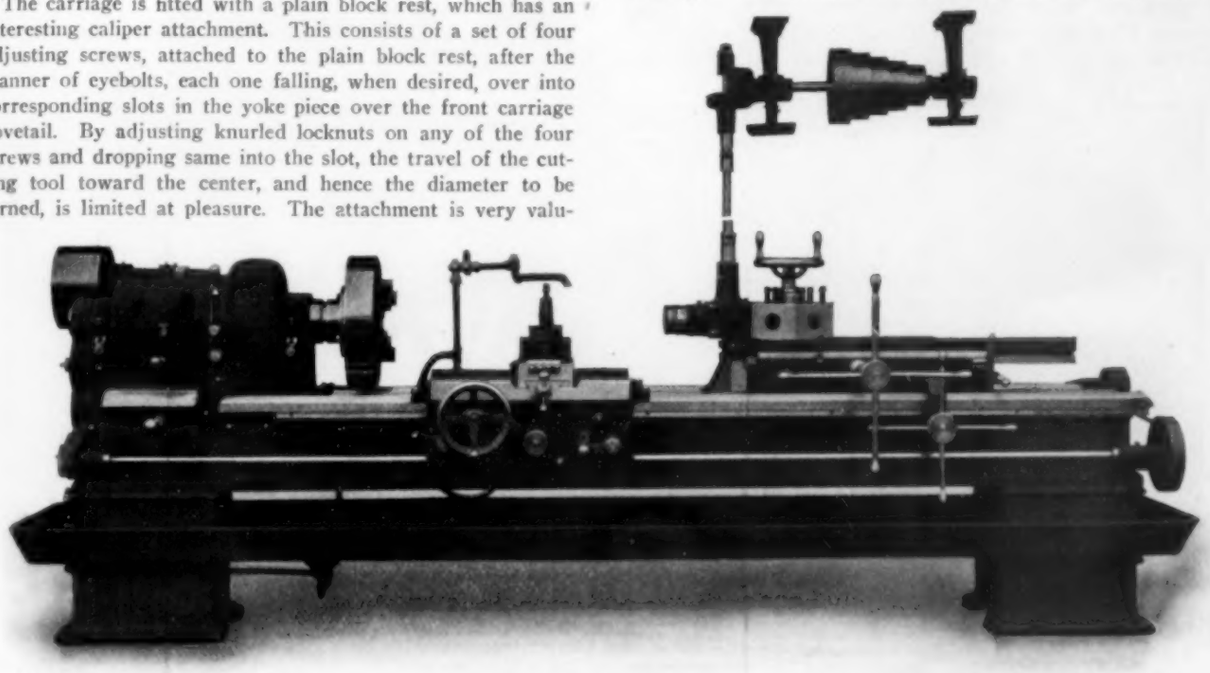
The members of the Engineers' Society of Western Pennsylvania were the guests of the Mesta Machine Co. on Saturday afternoon, Nov. 6, at its plant in West Homestead, near Pittsburg. A large amount of machinery ready for shipment was erected for this occasion. This company has under erection a new power plant and is considering the the erection of a new machine shop.

LATHE WITH SPECIAL BORING DEVICE.

The illustration presents an interesting lathe made by the American Tool Works Co., of Cincinnati. The machine is a 22-in. lathe with patent all geared head, pan, oil pump, turret, and special boring device. The entire screw cutting mechanism has been omitted on this machine, inasmuch as the lathe is primarily intended for roughing and boring, and has special feed. There are seven carriage feeds, ranging from .2 to .015, graded for the greatest efficiency in that character of roughing and boring planned for this lathe by the customer.

The patent geared head is of powerful and efficient construction. Only six gears are required to obtain four speeds through the levers shown on the front of the machine. This simplicity of construction enables the gears to be made of very wide face and large diameters and gives the entire mechanism sufficient strength to transmit the maximum power delivered by a 6-in. double belt. The four speeds obtainable through the head in connection with a triple friction countershaft supply twelve distinct speeds to the spindle, ranging from 5 to 322 r. p. m.

The carriage is fitted with a plain block rest, which has an interesting caliper attachment. This consists of a set of four adjusting screws, attached to the plain block rest, after the manner of eyebolts, each one falling, when desired, over into corresponding slots in the yoke piece over the front carriage dovetail. By adjusting knurled locknuts on any of the four screws and dropping same into the slot, the travel of the cutting tool toward the center, and hence the diameter to be turned, is limited at pleasure. The attachment is very valuable in duplicate work, as adjustments can be made for duplicate turning of pieces with four shoulders.



A NEW LATHE WITH BORING ATTACHMENT TO TURRET.

The hexagon automatic turret is of liberal size, with rapid and easy adjustments. It is provided with power feed driven by sprocket chain from the feed rod, thus giving fourteen feeds to the turret, ranging from .16 to .007. The worm is dropped out of mesh with the wheel by an improved tripping device, adjustable at will from the front of the machine.

The turret slide has an extra long bearing on the bed. The top slide has 24-in. movement controlled by pilot wheel and is supported on the front end by an improved supporting shoe sliding on the ways, and is firmly bolted to the end of the turret slide directly under the cutting tool. It insures accurate alignment in boring, and has gibbed bearing both at the top and bottom of ways, thus preventing all spring in any direction.

The drilling attachment is affixed to one of the faces of the turret. It consists of a symmetrical housing carrying miter gears which actuate a spindle with ball bearing thrust, and this carries the boring bar. The spindle is made to revolve from a separate overhead countershaft, as shown in the illustration, by means of universal joints connected by a telescopic rod compensating for any movement of the turret slide. The boring spindle revolves in the opposite direction to the main spindle on the head, an obvious advantage. The spindle has five rates of speed through the cone pulley on the countershaft, giving proper gradation to obtain the best results in the boring for which the lathe is intended. Whenever it is desired to use another face of the turret, it may be revolved without disturbing the drilling attachment, due to the telescopic rod. The boring tool is provided with oil supply drawn by auxiliary pump up through the turret stem and boring bar. The carriage has similar oil supply to the turning tool. The pan beneath the bed catches all waste oil, which is returned to the machine repeatedly. The lathe is very heavy and substantial throughout, to adapt it to the usually heavy strains which a lathe of this charcter must undergo.

Directors of the American Radiator Co. have declared an initial dividend of 1 percent on the common stock, payable Dec. 31. The dividend is a quarterly disbursement, and the common stock is now on a regular 4 percent annual basis. The directors also declared the regular quarterly dividend of 1¾ percent on the preferred stock, payable Nov. 15. President C. M. Woolley made the following statement: "The company, having devoted six years to the creation of a substantial fund for working capital, and as the business this year, both as regards volume and net profits, is progressing satisfactorily, it was decided that it would be prudent and conservative to begin the payment of dividends on the common shares."

In New York, Justice McCall, of the Supreme Court, has approved the report of the referee, Gerald Hull Gray, appointed in the foreclosure suit instituted by the Morton Trust Co. to foreclose a mortgage of $373,883, including interest and costs, on the property of the Compressed Air Co. Mr. Gray has been authorized to sell the property covered by the mortgage in its entirety. The mortgage covers all franchises, property and patents in the United States of the Compressed Air Co.

SOME NEW SHEARS.

The Erie Foundry Co., of Erie, Pa., has a new lever shear designed especially for use in scrap yards. This machine is shown in Fig. 1 and is made in several sizes with cutting capacities from one up to five inches square. The shear is illustrated with a belt drive but is also made for engine or motor drive as the purchaser may desire and is also built right or left-handed and with pitman or eccentric connection to lever.

The castings are made from a special mixture of very tough iron. The main pin is of hard steel with an adjustment by wedges to take up the wear. The shear is pitman driven and is claimed by the builders to be a better as well as a neater device than the cam drive. The pitman has extra large wearing surfaces and the thrust bearings are made of hard bronze. The lever has ample area of bearing and a thrust design permitting all side play to be taken up. The knives are of solid steel with four cutting edges.

The guillotine shears seen in Fig. 2 are designed with a clear way back of shear the full length of blade—a provision of particular value for sheet mill purposes. The machine is illustrated with belt drive, but is also made with motor or engine. The clutch is easy working and at the same time there is no knocking when connection with wheel is thrown out of gear. The gullotine shears are built in a number of standard sizes but other designs, are made for various dimensions of shears and speeds, etc. The shears are made either right or left-handed, with or without gag or hold-down.

The company makes a full line of angle, rotary, circular and hydraulic shearing machinery in addition to the lever and guillotine shears here illustrated.

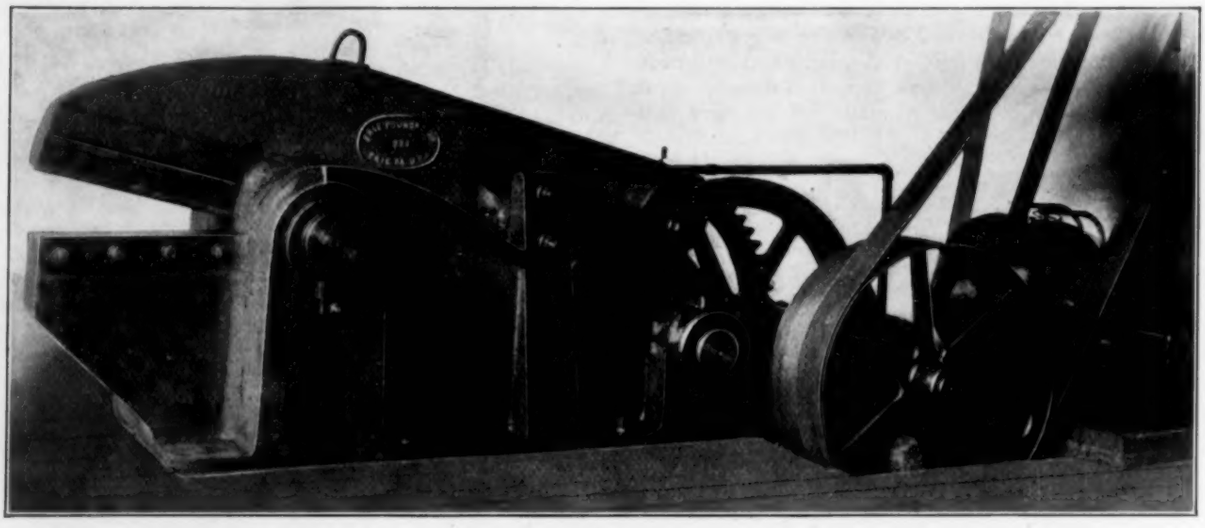


FIG. 1.—A NEW LEVER SHEAR.

The directors of the Lake Superior Corporation at their meeting last week took no action toward filling the office of general manager made vacant by the death of Cornelius Shields, except to leave the matter in the hands of a committee. T. J. Drummond, vice president of the company, will act as general manager for the present. It is thought that William H. Coyne, the former assistant to Mr. Shields, will finally be elected.

On petition of the attorneys of the Pittsburg Shafting Co., Buhl Sons & Co., and the Central Savings Bank, the Detroit Brass & Iron Novelty Co., Detroit, Mich., has been placed in the hands of Alexander I. McLeod, as receiver.

FORGING MACHINERY.*

BY JAS. H. BAKER.

Forging machinery consists generally of hammers, forging rolls and presses. We leave out cold drawing, as it occupies an intermediate field between forging and machine work, and consider only hot work. From a stone in the hand of a man to the 125-ton hammer has been a long road. In power hammers, we have trip hammers driven by a kind of cam, helve hammers and various types of upright hammers, driven by belts, through eccentrics, etc., steam hammers of both the forge and drop variety, hammer heads raised by a crank lift or windlass, or by a board working between friction rolls, and the hammer head allowed to drop on the work. These two last named are strictly drop hammers. The steam drop hammer is much like them, except that in it the falling of the head is generally accelerated by live steam. I do not go into the field of air hammers which are taking the place of hand hammers in many kinds of cold work. There are, however, several kinds of air hammers for forging, some on the principle of the steam hammer and some with individual air compressors forming part of the machine.

Drop hammers, generally speaking, as used for forgings, are those suited for using dies having a matrix, usually formed with part of the matrix in an upper, and the other part in a lower die, the work being compressed into this matrix by the blows of the hammer, and the surplus metal trimmed off. In drop hammers where strokes of uniform force are required, the crank-lift or board-lift is desirable. These are practical up to a reasonable weight of head, and for one stroke work, are well adapted. But for work requiring strokes of varying force, the steam drop hammer is superior. The difference between steam drop and steam forge hammers is in the valves and arrangements of the guides. Belt transmission of power from an economical engine is cheaper than power derived direct from a steam cylinder on a hammer. In a steam forge hammer having a head weighing 125 tons, falling a good distance with steam, in a correspondingly large cylinder driving it, we have something very powerful. Steam forge hammers have a wide field of use that I need not describe here. But in a general way, they are used much as a blacksmith works, the hammer doing the striking instead of the human helper. The trip hammer formerly was much used for forging hoe blades, fork tines, etc., because of its simplicity and hardihood, and with various forms of driving cams, this style of hammer

*Read before the Mechanical Section of the Engineers' Society of Western Pennsylvania, Nov. 1, 1904.

is useful in chain welding, bolt heading and innumerable other kinds of machine forging. For light work which can be handled rapidly, and which needs to be turned as it is being forged or welded, the belt driven hammer is preferable. This class of hammers reached and passed their limit at car axles.

The hammer will always be largely used but it is being superseded on many articles by the forging press and forging rolls. This change in favor of the press is clearly exemplified in the manufacture of armor plate and some other heavy forgings. It may be risky to say that anything mechanical has reached its limit in size, but I believe that the 125-ton steam hammer reached and passed it. The forging press in its lighter forms is used for making pick eyes, forging picks, hand hammers, chisels, sledges, etc.

As to the limit in drop hammers, we now have steam drops with heads as large as five tons, and I am inclined to think that this is about their limit. The shock in drop hammer work is very great and repairs correspondingly so, and an additional source of trouble is that a good deal of work often comes at one side of the vertical line of the piston rod, and this is hard on piston rods and guides. I think the forging press in connection with the drop hammer will tend to remove this difficulty.

Forging rolls are now used for making many articles in whole or in part, formerly made on hammers, such as fork tines, brake shoe keys, ends of springs, horse nails, harrow discs, sucker rod joint-straps tapering plow beams, etc., etc. For instance, here is a piece of work in which a bar of 1 x ½-in., 7½-in. of which has been drawn to a length of 16 in. at a single pass in eccentric rolls, most of its cross section being reduced to ⅛ x 1⅝-in., the actual time of contact being less than ½ second. The same work under a hammer would, as you can easily judge, have taken many, many times as long. But quality of product is another quite important factor, especially in heavy work, therefore the question of hammer versus press must be decided accordingly. The press forging method, so far as it is applicable to heavy work has decidedly the lead. This is so well known that it needs only to be mentioned. Press and roll forging very often have the advantage of a great saving in die cost, as cast metal can be used for dies.

Another largely used form of machine is that of the bolt heading type. Generally, there is a gripping device placed at an angle, usually a right angle to the line of travel of the heading tool in these machines. In the larger sizes they are often called up-setting machines, forging machines, etc. They are driven by pneumatic or hydraulic means, by gearing actuated by electric motors or by transmission of power through belts. And here again, each form is best adapted to certain kinds of work. One would not think of using a hydraulic machine to head ¼-in. bolts, while nothing but hydraulic means would be thought of for drawing a 12-in. tube. And in certain cases the question of rapid versus slow motion would be the deciding factor.

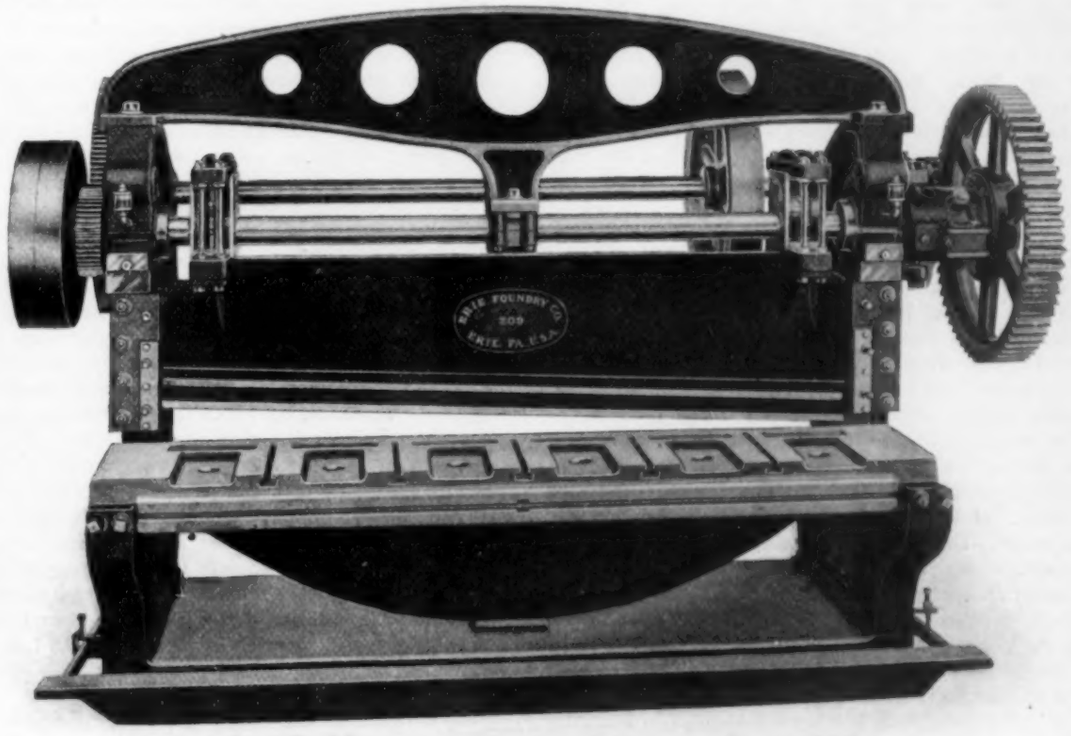


FIG. 2.—THE ERIE GUILLOTINE SHEARS.

In bending machines the description of forging machines of the bolt heading type will hold good. Where the stroke of the traveling die has to be of uniform length, if possible, the geared machine should be used. On the other hand, if the work is of such nature as to have an uneven amount of metal under the die at its finish, it is better to use pneumatic or hydraulic means. For instance, you might make certain kinds of bends in bars of varying thickness, in a pair of dies without changing the set of the dies by using pneumatic means. Again, you can have a very long stroke pneumatic machine and yet make quite short strokes when needed, and this is often quite economical.

There are forgings which can be most economically made by a combination of methods. Here is a shovel socket that was produced economically and nicely by a combination of three methods. The flat end was made in a drop hammer, the short tube was made in forging rolls that drew the walls of the tube at one end to less than one-half their thickness at the

other end, and at the same time welded the tube and then a rapidly striking hammer was used to weld the heavy end of the tube to the drop forged part.

Proper heating is an important factor in forging and should perhaps have some mention here. To illustrate, if you wish to make an upset of 2-in. in thickness by 4-in. in length, on the end of a bar 1½-in. thick, the back part of the metal should be much the hottest, or the front part of the holding die will fill first, and the back part will not fill. Again, improper heating will allow oxidation and so make trouble in rough work, bad welding, etc. We have heard a good deal about some kinds of fuel making iron softer and easier to work, etc. Now I do not believe there is anything of this in the fuel *per se* and yet there can be no doubt as to some heating being better than others. This is due to unsuitable burning devices. It all seems to be a question of how far the perfect mixing of oxygen and carbon can be accomplished, and at the same time be advantageously applied. Repeated experiments in welding chain links showed on an average, that 100 pounds of links heated in the blaze of coke lost seven-eighths of 1 percent in weight, while the loss when heated in natural gas was 2¼ percent. But this only showed that free oxygen found its way to the metal more freely in the gas heating. I need only mention the fact of enclosing bright articles in a sealed box and heating them to a red by applying the heat to the outside of the enclosure as an example of what can be done without scaling when oxygen is practically kept out of reach.

In welding, please distinguish between electric welding which in many cases consists in fusing or melting the surfaces together, and welding proper, as generally understood. In electric welding, the metal is often brought almost to the ingot condition, and when in such forms as to allow of little or no subsequent work leaves it nearly in that condition. By welding proper, I mean heating the metal to a degree below the melting point, and in cases of particular work much below it, freeing the surface from oxide, dirt, etc., and hammering or pressing these clean surfaces together until the weld is made. This leaves the condition of the metal nearly as good as before. The press is not well adapted to making lap welds, the slow motion causing a comparatively long contact of the dies, thus cooling the thin part of the laps before the weld can be completed. Iron or steel need not be very hot to weld, the extra heat usually given serving the purpose of freeing the surfaces from oxide and keeping them free until the weld is made. The higher heat also softens the metal, making it easier to forge to size while welding. In soft steel and iron we generally bring them to a bright sparkling heat, which melts the oxide. In high carbon steel this high heat would not be allowable, and therefore a chemical agent is used such as borax, etc., to reduce the oxide to a fluid condition at a comparatively low heat.

Electric heating and welding has a field peculiarly its own. It is serviceable in joining very light work, much of which could not be done to advantage in a forge fire, such as the ends of long pieces of pipe, crossed wires, etc. Again, an electric current can be carried to, and used for welding parts of structures while in place, which would be an impossibility otherwise. On the other hand, in large cross sections, in electric welding as usually practiced, you would beat the central portions of the cross section more than you would the edges, and therefore by the time you had the edges hot enough, the central portion would be melted, you would have the condition mentioned before. Thermit welding, so far as I can see, has some of the same limitations as electric. In fact welding might be generally divided into two classes, one in which physical work is the principal agent, and the other in which it is absent or only incidental.

Some years ago, I saw a very interesting thing in automatically welding 12-in. pipe, the pipe being bent, heated and welded in a continuous process from start to finish. But it proved to be troublesome and did not stop for a defective spot in the weld, and has, I believe, been discontinued and the expensive plant sold as scrap.

Automatic working of metal has been carried to a high degree of efficiency in cold work. But in hot work it has not advanced much, the reason mostly being in the fact that one of the fundamentals in automatic work, is that the product of each separate operation must be uniform in order that feeding or changing devices may transfer the work to the next form, or die. The difficulty is, that the heating may be irregular, the loss by scaling greater or less, and therefore the action of a given operation will not produce a uniform product. But in articles which can be grasped at one end and worked from the grip, automatic work is practical in hot metal. Hence, we see it done in the manufacture of rivets, spikes, horse nails, etc. One of the most important questions is how to group, or arrange machines. In a shop where a variety of articles is made, it is next to impossible to do this so effectually that the sequence of operations will not sometimes be interfered with. I can only say, that machines should be grouped so that the work may pass directly from one machine to the next, rather than have each class of machines set by itself, which would mean all the hammers at one point, all the presses at another, etc.

Now let me describe the first power forge I ever saw. Picture to yourself a narrow valley between mountains where the sun shines only a small part of the day, a road leading to it so rough that two horses could hardly haul a ton of iron, a small stream of water carried along the hill side until it has a fall of, say 16 ft., then falling into a vertical box, this box joined at its lower end to another box lying horizontally, having an escape at its opposite end for the water on its lower side, and on its top side a hollow log for a pipe and you have the blowing device, by which the pig iron was melted in an open-hearth forge fed with charcoal. Then a dam, a water wheel made of wood, its shaft extending into a log building with a clapboard roof, a trip hammer run by projections set in this shaft to drive the hammer, and you have a forge that made about one-half ton of bar iron in a day. From the foregoing it will be seen we have a great variety of forging machinery, but we shall always have use for knowledge, experience, industry and hard common-sense, and for the welfare, development and happiness of humanity, I am glad of it.

Colorado Fuel & Iron Co.'s Report.

A deficit of $1,584,857 for the fiscal year ended June 30, 1904, is shown by the annual report of President Frank J. Hearne, of the Colorado Fuel & Iron Co., to the stockholders. A year ago the books of the company showed a profit of $586,-112. The net earnings amounted to $31,211, leaving a deficit of $1,168,366. Other charges, such as $45,865 sinking fund; personal injury fund, $6,000; sociological department, $13,538; losses on Colorado & Wyoming railway guaranteed traffic of $300,000 per annum, or $251,164 net, and losses on Crystal River railroad guaranteed traffic of $36,000 per annum, which for last year amounted to $22,458, make a total additional deficit of $416,491, and bring the gross from $1,168,366 to $1,-584,857. These losses in guarantees to the two railroads come from the labor troubles cutting off almost entirely shipments of iron and fuel.

The Colorado Fuel & Iron Co. has filed at Pueblo the fifth amendment to the articles of incorporation. The action taken at the recent meeting of directors in Denver, when a financial reorganization took place, is recorded. The capital stock is placed at $46,200,000, divided into 460,200 shares. Twenty thousand shares are of preferred stock drawing 8 percent. Of treasury stock there are 150,000 shares.

NOTES ON THE BLAST FURNACE.

BY JOHN M. HARTMAN.

The bosh of a blast furnace is filled with glowing fuel when working properly. On top of this bed of fuel is the short zone of fusion in which all the ore and limestone disappear, leaving the fused material, iron and cinder to run down through the bed of fuel in the form of shot. The bosh must be low enough to permit the zone of fusion reaching above it. Above the zone of fusion is the zone of carbonization where the ore receives its final reduction and carbonization before fusion. This zone is filled with finely disintegrated fuel, ore and lumps of lime. When the furnace is not scaffolded this zone determines the pressure of blast by its depth. In the charging of fine ore in the furnace it rattles down through the fuel and limestone to the top of the zone of carbonization, making the zone deeper and necessitating higher pressure of blast. Old furnacemen with light blowing engines blew the furnace down until the zone of carbonization becoming less deep eased up the pressure, when the work of filling commenced again. Sparks in the gas show the zone of carbonization is disturbed.

No new ore arriving on the zone of carbonization, the fusion below melts away this zone, making it thinner. If the plant is well equipped with reserve power in the engines, boilers and stoves and the furnace is driven more rapidly, the accumulation in this zone can be prevented. Furnacemen fear to do it lest the ore coming down unreduced gives poor iron. This will soon show by the color of the cinder if the ore is unreduced.

This brings up the question of fast driving. In the Mt. Hope charcoal furnace the ores were exposed three hours in making foundry iron, disintegrated magnetic ore being used. In the Catalan forges concentrates are reduced to wrought iron in two hours. In the Alice furnace of 6,500 cu. ft. capacity, No. 3 iron was made with six hours' exposure and 59 ft. of working height using Mesabi ore and a blast temperature of 900 degrees with cast iron stoves. The burden carried at the Alice furnace was equal to the burden carried by furnaces having firebrick stoves. This, by the way, is due to firebrick stoves not having the proper amount of heating surface to carry 1,300 degrees through the blow, as the heat varies and runs down to 1,100 degrees with 450 degrees temperature of escaping gas at chimney. Maintaining 1,300 degrees uniformly is only possible where the firebrick stoves have 5 sq. ft. of surface to each cubic foot of air, and use equalizers to maintain a constant temperature.

When firebrick stoves become glazed they require far more gas to heat them up and the blast is more irregular in temperature from the beginning to the end of the blow. The glazing of the brick work can only be prevented by large heating surface and burning the gas in a separate combustion chamber. When furnacemen say they only need 500 to 1,000 degrees of hot blast it will be found the stoves are too small or they are afraid to run the risk of a heavy burden.

With firebrick stoves there will be no trouble passing the stock through in six hours, as the Alice, with pipe stoves and 900 degrees, did it with as good fuel economy as furnaces with brick stoves. What is the use of high furnaces so far as hearth is concerned? The 17-ft. hearths are too large and to get penetration small tuyeres and high pressures to force the air through the hearth are required, causing a great expense in blowing.

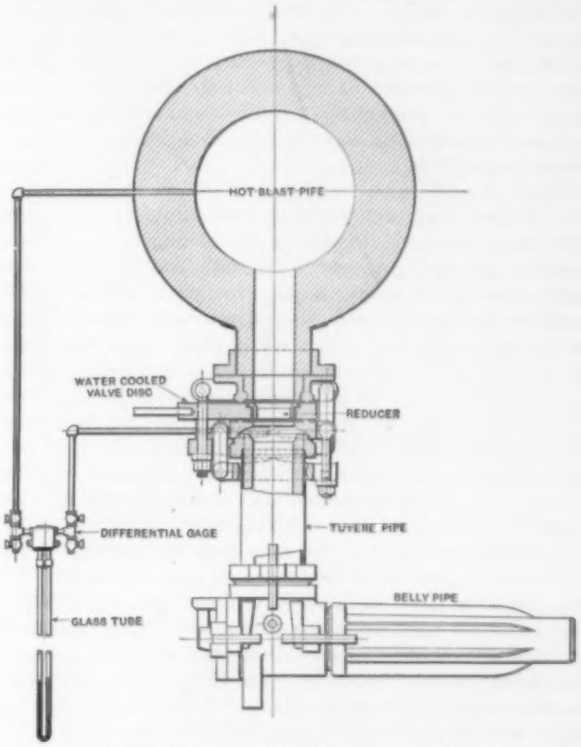
One ton of coke having 85 percent of carbon requires 145,000 ft. of air to burn it, or say one ton of coke used every four minutes. This with a burden of 2.16 to 1 would give a daily output of 60 percent ore or 450 tons per day if ores are broken small. Thirteen feet of the largest hearth that has been found practicable and 35,000 cu. ft. of air actual delivery will be the proper volume to blow it. The limit of the furnace is the hearth and with a 60-ft. stock column there will be ample time for reduction providing the ores are broken small.

Irregularities in the quality of the iron are largely due to unreduced ores and limestone in the form of large lumps which the furnace has not had the proper time to reduce. All ore should be crushed to ¾-in. cubes before being placed in the furnace.

The first and easy part of the reduction of ores takes place before reaching the zone of carbonization. In this zone the exterior of the ore parts with the balance of its oxygen. As the exterior ore parts with the oxygen it absorbs carbon, causing it to swell and peel off. As it disintegrates the lump becomes smaller, allowing the carbon finally to get into the center, by which time the ore is thoroughly reduced and carbonized, if the furnace settles regularly.

It is cheaper to crush the ores and limestone at a small expense and thereby get better fuel consumption with more regular iron? What can be done mechanically at low cost should be done to avoid doing it chemically at a great expense.

When unreduced limestone gets into the zone of fusion the



METHOD OF ATTACHING DIFFERENTIAL GAUGE.

iron sponge, owing to its high heat, will seize on the carbonic acid, split it up and the sponge be oxidized, giving a scouring slag. When too much stone is used it gets to the tuyeres and prevents the air reaching the fuel at once. Instantaneous combustion at the tuyeres is required for good work.

The low furnace will work with much less blast pressure requiring less powerful blowing engines, less boiler capacity and the use of less gas to give the blowing power. The loss with high pressures is enormous. Extra firing, with its cost to keep up steam, often has to be resorted to.

With these high pressures wasting the power there comes another loss. A new plant fitted up and tested, it will be found that at 2-lb. pressure the loss in leakage will be about 2 percent. Ten-lb. pressure increases it to about 25 percent. From this it can be judged what the leakage is at 25-lb. pressure. The power here wasted is larger than is generally known. The pressure has increased with the high furnaces.

Taking the average of charges on a coke furnace 80 ft. high it will be found there is exerted on the zone of fusion a pres-

sure of 3,270 lb. per sq. ft., or, say, 23 lb. per sq. in. If the furnace is increased to 100 ft. high this pressure will be 32 lb per sq. in. The side thrust of the stock in the bosh packs it so tight together that it forms a constant bridge and we have to rely on the burning away of the coke below this jam to keep the furnace moving. The taper of the bosh acts as a wedge to jam the fuel closer together. At times this jam becomes so great that the stock is held up, the pressure increased and a large volume of coke burned from underneath the jam, making a great cavity before the jam lets loose and the stock comes down. When it does come we have a mass of gas, coke and ore dust that completely covers the plant so that it cannot be distinguished until the dust blows away. The high pressure finding a sudden relief makes the blast rush through the tuyeres which fires the gas in the interior of the furnace, causing an explosion that lifts the bell and hopper.

When this slip occurs the zones of fusion and carbonization are destroyed. The furnace then has to form new zones of fusion and carbonization. The result is irregular iron. The jam on the bosh can be prevented by letting the blast work harder on the walls, taking care at the same time that sufficient blast penetrates through to the center. Working hard on the walls soon destroys them unless water cooling of the brick work is provided. The use of bosh plates in rows about 30 in. apart will prevent this to a certain extent, but it makes a rough irregular bosh wall, causing the furnace to make numerous short slips.

These bosh plates only cool the bosh where they are put in. The cooling power extends but a short distance from them. The use of bosh jacket covering and cooling the entire bosh surface completely preserves these walls and gives a smooth bosh where there is less liability for small scaffolds. The water in this case has no chance of getting in the furnace, as the pockets of the bosh jacket are not over 24 in. deep. The pressure of blast inside the furnace is so much greater that even if a leak started the blast would blow back the water and prevent any water entering the furnace. The leak in this case is immediately located by the water turning white, while with the bosh plates the water pressure forces the water into the furnace and it is exceedingly difficult to tell what plate is leaking and much time is lost in locating them. In tests, each extending over one year at the same furnace and under same conditions, it was found that one cwt. less of fuel was used with the bosh jacket than with the bosh plates. It has been found that the brick work between the bosh plates has melted out until the contact of the cold air from the outside stopped the melting of the brick work. The bands placed around the furnace to support the walls between the bosh plates covering the brick work prevented the abstraction of heat and the walls melted back to the band. This space was found filled with cinder and coke which had replaced the brick walls. The number of water connections on the furnace should be kept down as far as possible. Less water is required with bosh jackets and loss of heat is no greater. Fewer tuyeres of the larger size can be used if care is taken to get a good dispersion of the blast sideways. The use of hotter blast will give more penetration to the blast, as the hotter the blast the quicker will be the burning of the fuel and the higher the heat at the tuyeres where the heat wants to be concentrated. This prevents the formation of tubes of cinder.

Take the old furnace practice with its colder blast. There was always formed at the nose of the tuyere a tube of chilled shots of slag which carried the blast into the furnace until these tubes became chilled and caused high pressure, compelling the keeper to break them away with a pricker rod. A pipe with ¼-in. opening and 500-lb. pressure to the sq. in. can be stopped and held tight with the thumb alone. How can we expect the blowing engine giving 12-lb. pressure to blow through a dark tuyere with the cinder chilled around it?

It will be borne in mind in making No. 1 iron with a basic cinder, that the cinder melts at about 3,500 degrees. At 1,300 degrees this cinder is stiff and hard, and unless there is good live fuel at the tuyeres to produce then and there a heat of 3,500 degrees there will be more or less chilling influence by the blast entering at 1,300 degrees. The hotter the blast the quicker the fuel is burned and the heat concentrated at the tuyeres. When a tuyere gets dark or shows signs of not working, the pricker rod should be used immediately and if that does not clear the nose of the tuyere than a small cartridge, costing but a few cents, can be exploded and break through the obstruction, letting the blast enter and get at the nearest fuel, which will soon melt away the obstruction. On this point furnacemen are slack and afraid to use a cartridge costing a few cents, when by its use they can save many dollars. If the blast does not get into the furnace iron will not come out. A bright tuyere, as known to the furnacemen, must be distinguished from a glowing tuyere. A glowing tuyere shows but little blast is entering and furnacemen will use their pricker rod on the bright tuyere because it is not so glowing as the other, while the bright tuyere is doing the most work and the glowing tuyere the least. The same volume of blast should enter each tuyere and work uniformly through the hearth to keep the zone of fusion level. Especially is this required with the large hearths now used.

Use of the Differential Gauge.

The differential gauge is provided as follows: Place at the top of the tuyere pipe a valve to be used for cutting off the tuyere when so desired and arrange the valve so that it can be enlarged or decreased by a bushing as required. Then tap a small pipe into the hot blast pipe above the valve and another pipe below the valve and attach to them a bent U of glass. Charge the U tube half full of water and leave the blast pressure on both sides of the tube. There will be found a difference in the height of the water of the two legs of tube. This is due to the friction of the blast passing through the reducer in the valve. If the tuyere works open and free there will be a difference of say 1 in. of water pressure between the two sides of the tube. If the tuyere has become closed and is not taking blast there will be no difference in the height of the level of the water in the two tubes. This tuyere then must be opened at once, whether bright or dark. The ratio of difference of the height of water in these two tubes will show the ratio of blast passing through the tuyere. These gauges are small and simple and placed in a case on the side of the casting house. Proper tubes are led to each gauge from the furnace. A simple inspection along the row of gauges, which we call a differential gauge, will show at once what tuyeres are taking blast and what are not.

The tuyeres that are not taking blast have become clogged from some cause and an opening must be made in the material at the front of the tuyere at once to prevent lopsided working of the furnace, and disturbance of the zone of fusion. The first thing to be done is a vigorous application of the pricker rod, and if this does not give an opening then the cartridge must be used. Many furnacemen have feared the use of the cartridge. It should be placed in careful hands, but there is no way so cheap and quick as the use of these small cartridges to open up the tuyere.

Blast entering the tuyeres does not always take a straight course but wanders around through the hearth, where it meets the least resistance. Instances have been found where the blast from one tuyere was passing across the nose of another tuyere to reach the cinder notch. These little gauges, small and cheap, are invaluable to a keeper who will pay strict attention to them. If he does not he had better throw them away and go on with his old rule of thumb way of working the furnace. The gauges have been used for 20 years, but they will not prick a tuyere nor explode a cartridge.

Seventy years ago the cane juice was boiled to sugar in an open pan with a fire beneath. It was difficult, almost impos-

sible, to produce exactly the grain and quality of sugar. If it would crystallize too much it would solidify in the pan and have to be chopped out. This was partly overcome by boiling with steam through a coil, but even here it required the greatest care and skill. Even with that the sugar would solidify at times and have to be chopped out of the pan. This was followed by closing the pan, forming a vacuum in it and boiling the cane juice in vacuum. Here the trouble of solidifying also followed them and increased as the vacuum pans were made larger. Finally they resorted to the use of gauges placed in different parts of the pan to tell them just what was going on in the pan. At the present time a sugar boiler will boil sugar exactly to the grain wanted and to the quality, but he stands over that pan watching every gauge and all the indications that he has to show him of the progress of the boiling.

Why should a furnaceman not resort to gauges and all other means that will show him just what the furnace is doing and thereby produce steady uniform results.

SMELTING ORE BY ELECTRICITY.

The report of the commission appointed by the Canadian government to investigate the different electro-thermic processes for the smelting of iron ores and the making of steel in operation in Europe has been published, with the report of a special commission appointed to investigate the Marcus Ruthenburg process of electric smelting of magnetite. The reports are elaborately illustrated and give a large amount of information in regard to the various processes. The commissioners, under the direction of Eugene Haanel, superintendent of mines, spent several months in Europe, investigating the Kjellin, Heroult, Stassano and Kellar processes. The conclusions in regard to the metallurgy of the electric production of steel and the electric smelting of iron ores are as follows:

1. Steel equal in all respects to the best Sheffield crucible steel can be produced, either by the Kjellin or Heroult or Keller processes, at a cost considerably less than the cost of producing a high-class crucible steel.

2. At present structural steel, to compete with Siemens or Bessemer steel, cannot be economically produced in the electric furnaces, and such furnaces can be used commercially for the production of only very high class steel for special purposes.

3. Speaking generally, the reactions in the electric smelting furnace, as regards the reduction and combination of iron with silicon, sulphur, phosphorus, and manganese, are similar to those taking place in the blast furnace. By altering the burden and regulating the temperature by varying the electric current, any grade of iron, grey or white, can be obtained, and the change from one grade to another is effected more rapidly than in the blast furnace.

4. Gray pig iron, suitable in all respects for acid steel manufacture, either by Bessemer or Siemens processes, can be produced in the electric furnace.

5. Gray pig iron, suitable for foundry purposes, can be readily produced.

6. Pig iron low in silicon and sulphur, suitable either for the basic Bessemer or the basic Siemens process, can be produced, provided that the ore mixture contains oxide of manganese, and that a basic slag is maintained by suitable additions of lime.

7. It has not been experimentally demonstrated, but from general consideration there is every reason to believe, that pig iron low in silicon and sulphur can be produced even in the absence of manganese oxide in the iron mixture, provided a fluid and basic slag be maintained.

8. Pig iron can be produced on a commercial scale, at a price to compete with the blast furnace only when electric energy is very cheap and fuel very dear. On the basis taken in this report, with electric energy at $10 per e. h. p. year, and coke at $7 per ton, the cost of production is approximately the same as the cost of producing pig iron in a modern blast furnace.

9. Under ordinary conditions, where blast furnaces are an established industry, electric smelting cannot compete; but in special cases, where ample water power is available and blast furnace coke is not readily obtainable, electric smelting may be commercially successful.

It is impossible to define the exact conditions under which electric smelting can be successfully carried on. Each case must be considered independently after a most careful investigation into local conditions, and it is only when these are fully known that a definite opinion as to the commercial possibilities of any project can be given.

Concerning the Marcus Ruthenburg process of the electric smelting of magnetite, at Lockport, N. Y., the conclusion of Eugene Haanel, superintendent of mines, is that the reduction of the magnetite, either in the reduction gap of the furnace, or in the soaking pit below the furnace, has been insignificant; and that whatever the claims may be by the patentee for his process, the results of the investigation demonstrate its entire failure as a process for either agglomerating and fritting the finely-divided ore, or for any useful reduction of the iron ore. Mr. Haanel states that the fact that the magnetic loses its magnetism before incipient fusion takes place will prevent the agglomeration of the charge in the pit, and the narrow gap between the poles, through which the charge requires to pass, will always render the capacity of the furnace small. These two facts should at once preclude the hope that modifications of the process will render it comercially useful for agglomerating finely-divided ore, in substitution of briquetting.

The report has an appendix giving several treatises and lectures on the electro-metallurgy of iron.

Large Steel Rail Output for 1904.

General Manager James M. Swank, of the American Iron and Steel Association, makes the following nteresting comment on the iron trade situation in the current issue of the *Bulletin*. Especially significant is the statement concerning steel rail production this year:

"October closes and November opens with a feeling of exultation in the iron trade over the business situation and outlook to which it has been a stranger for more than a year. There is an active demand for nearly every product of our iron and steel works and prices are advancing, particularly for pig iron. The railroads lead the buying, as they need cars and locomotives, and they are buying rails more freely than in the earlier months of the year, but liberal orders for all kinds of pipe, structural material and other finished forms of iron and steel are also of daily occurrence. Speaking of rails, the public has been badly informed about the tonnage for this year. It will not fall very far below that of 1903, which was the largest in our history, as was that of pig iron.

"The iron trade of this country during the past twelve or fifteen months has really been more scared than hurt. It has been a more active producer of pig iron and of finished forms than is generally supposed. It has now recovered from the feeling of apprehension with which it has been to a certain extent oppressed, in sympathy with the stock market. We look confidently for a continuation of the present active demand for iron and steel."

The description of the electric trolley on page 89 of *The Iron Trade Review* for Nov. 3 did not give the height correctly. The machine is a very low type trolley made by the Northern Engineering Works, of Detroit, and occupies only 13 in. above the rail.

MECHANICAL DRAFT APPARATUS.

The application of fans to induce draft work has made necessary many changes from the established standards of fan builders in order to avoid difficulties never met with in other lines of fan work, and even hardly anticipated in this. Most of the fans on the market today are built with two or three spiders except in the very small sizes. A fan of the standard

FIG. 1.—THE AMERICAN BLOWER CO.'S FAN WHEEL.

type usually has a bearing on each side of the fan, making the distance between bearings comparatively short. With this arrangement there is no deflection to the shaft and the fan wheel is very smooth running. But when these fans have to be adapted to the handling of hot gases, it is necessary to remove the bearings from the path of the gases. This change demands an overhung wheel or the placing of one bearing outside of the inlet chamber built onto the side of the fan. Unless the bearings are placed very close to the center of the fan, the overhang causes deflection and works the keys loose and may cause the fan wheel to strike the housing. The same is in a large measure true of the two bearings far apart. Increasing the diameter of the shaft is not a comforting prospect, as the added weight tends to deflection. Then again, the

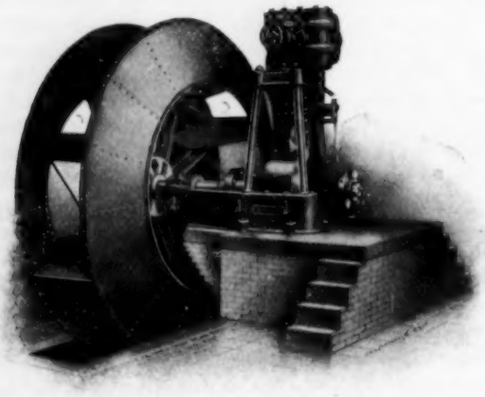


FIG. 2.—ENGINE DIRECT CONNECTED TO FAN WHEEL FOR MECHANICAL DRAFT PLANT.

intense heat within the housing causes it to expand, and as the steel frame work of the housing is outside and at a much lower temperature than the shell, the natural curvature, if any, is inward. Just how much this expansion will amount to cannot be predetermined. Hence, the greatest care in setting up often proves of no value when the fan is put in operation.

These are points for very serious consideration with any one who has had experience with this line of work, and the American Blower Co., of Detroit, has devoted much attention to the improvement of these details. Fig. 1 shows a wheel of the latest type of construction. The spider is made up of I-beams with about three times the strength of a double set of the usual T-arms. In addition to this, every blade is braced with bar iron braces from outer rim to center. In the side of the fan housing is built a very deep cone which reaches in close to the hub. A special arm of very heavy construction is built on the cantilever principle to carry the water jacketed inner bearing. This is placed at the very apex of the cone. The distance from the end of the apex to the end of the projecting shaft seldom exceeds a foot.

Fig. 2 shows a fan wheel mounted on a shaft with a direct coupled engine erected on this form of construction. It is not always customary to make an extension of the base of the engine as here shown. In some cases an I-beam grillage is built into the brick foundation, the engine bieng set on top of the outer ends of these I-beams and anchored down, which makes practically a complete unit of the entire outfit, as shown by Fig. 3.

Two large units of the character shown by Fig. 2 have been furnished the Wilkes Barre & Wyoming Valley Traction Co., of Wilkes Barre, Pa. These wheels are encased in a three-quarter steel plate housing, the wheels being 11 ft. in diame-

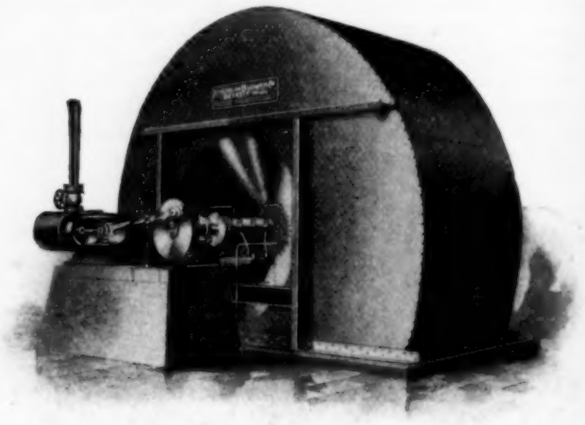


FIG. 3.—ANOTHER TYPE OF DIRECT-CONNECTED ENGINE AND FAN.

ter and driven by 12 x 10-in. vertical engines. They are intended to furnish induced draft for the power house.

The Franklin Institute committee on science and the arts has adopted a recommendation signed by James Christie, Charles Day and Robert Job for the award of the John Scott Legacy Premium and Medal to Henrik V. Loss, of Philadelphia. Mr. Loss was the inventor and designer of the machinery built for the manufacture of hydraulically forged, solid rolled, steel wheels for cars. The machines are in use at the Schoen works near Pittsburg, and were fully described in *The Iron Trade Review* of May 5-12. The award of the committee of the Franklin Institute is specifically for Mr. Loss' improvement in the production of solid rolled steel car wheels.

The Bankers' Adding Machine Co., Cleveland, has been placed in the hands of William Howell, as receiver. It ceased operations two weeks ago for lack of funds. The company holds a number of patents and its machinery is said to be of considerable value.

The Schuylerville Bridge Co., Saratoga Springs, N. Y., has gone into the hands of a receiver in the State courts and three creditors have filed a petition of involuntary bankruptcy.

PITTSBURG FOUNDRYMEN'S ASSOCIATION.

Three interesting papers were read at the monthly meeting of the Pittsburg Foundrymen's Association held at Pittsburg, Monday, Nov. 7. Eliot A. Kebler, resident manager of Matthew, Addy & Co., gave "Notes on Southern Iron," which was followed by the reading of a paper by S. H. Stupakoff on the "Pyrometer in Blast Furnace Practice." J. F. Brown, foundry superintendent of the Mesta Machine Co., described a new test bar which he has been successfully using and which created much interest.

Mr. Kebler's paper resulted in considerable discussion, he having brought out some points with reference to Southern iron that were unknown to many of the foundrymen present. S. D. Sleeth, of the Westinghouse Air Brake Co., said that they are using Southern iron extensively and have used about 100,000 tons in the last twelve years. Throughout his experience he said that the lowest phosphorus content of the iron was .82 and the highest 2.50 percent. Too much phosphorus in the iron creates spongy places in the castings, he said, and it is owing to this high percentage of phosphorus that many cannot use it successfully. After making his first purchase of Southern iron the agent told him not to become frightened when the iron was delivered in the yard, explaining that its appearance would be against it. The pig iron agent's hopes were more than realized, pigs from the same car showing varied fractures. Tests made later, however, showed that while the fractures differed the iron was of uniform analysis, and since that time it has been used extensively in their work. It was further explained that Southern grades of foundry iron more often run too high in silicon than too low, and the point was made that foundrymen place entirely too much dependence on the silicon content, when the amount of total carbon should be considered first. While the average total carbon of Southern grades ranges from 3 to 3.5 percent, the Northern grades of iron run from 3.7 to 4 percent and higher. A high phosphorus iron with low total carbon, it was explained, will not pick up as much carbon in passing through the bed of the cupola as an iron low in phosphorus, the latter taking up almost as much carbon in passing through the cupola bed as is lost. It was added that too much silicon in iron has a tendency to harden the castings, very soft castings having been made with the silicon as low as .8, while the carbon was up to 4.60. Mr. Kebler exhibited a number of samples of Southern iron, one piece containing 50 percent of silicon.

In the discussion on S. H. Stupakoff's paper on the pyrometer it was stated that no instrument had yet been devised for measuring the temperature of molten metals, and the hope was expressed that some instrument would be offered whereby the foundrymen could measure the temperature of iron in ladles. Herbert E. Field, metallurgist, of Mackintosh, Hemphill & Co., said that in conducting tests to ascertain the relative merits of the blower and fan for the foundry, he used the LeChatelier pyrometer successfully in ascertaining the temperature of molten iron in ladles. The thermo-couple in addition to being enclosed in a tube was further protected to guard against accident, and the temperature of the iron in ladles on two different days was correctly ascertained.

At the December meeting of the association the committee appointed to investigate the relative merits of the blower and fan for foundry purposes will make its report. The tests were made at the plant of Mackintosh, Hemphill & Co., and were exhaustive. At the business session Arthur A. Hamerschlag, director of the Carnegie Trade School of Pittsburg, was elected an honorary member. The following were in attendance:

J. S. McDonald, Westinghouse Electric & Mfg. Co.
B. D. Fuller, Westinghouse Electric & Mfg. Co.
W. J. Davis, H. K. Porter Co.
E. D. Frohman, S. Obermayer Co.
Wm. Hanna, Macintosh-Hemphill & Co.
L. E. Dunlap, Mackintosh-Hemphill & Co.
H. E. Field, Mackintosh-Hemphill & Co.
A. O. Backert, *The Iron Trade Review.*
S. H. Stupakoff.
W. J. Naeser, Yagle Foundry & Machine Co.
John A. Schick, Westinghouse Air Brake Co.
W. J. Dorsey, Enterprise Foundry Co.
G. C. Schade, Braddock Machine & Mfg. Co.
Charles Cook.
James Keegan, Frank-Kneeland Machine Co.
J. F. Brown, Mesta Machine Co.
W. F. Coburn, Mesta Machine Co.
R. H. West, Mesta Machine Co.
H. Penrose, L. & R. Wister & Co.
John McLaren, Phillips & McLaren.
E. H. Geisay, Harbison-Walker Refractories Co.
J. L. Jones, Westinghouse Electric & Mfg. Co.
W. J. Reardon, Westinghouse Electric & Mfg. Co.
S. F. Warren, Pennsylvania Malleable Co.
E. A. Kebler.
T. E. Malone, J. S. McCormick Co.
E. Wentz, Seaman-Sleeth Co.
Mr. Bertsch, Seaman-Sleeth Co.
Stuart B. Marshall, L. & R. Wister & Co.
F. A. Johns, Enterprise Foundry Co.
S. D. Sleeth, Westinghouse Air Brake Co.
F. H. Zimmers, Union Foundry & Machine Co.

Notes on Southern Iron.

Mr. Kebler's paper was as follows:

At first sight it seems rather presumptuous to discuss Southern iron before foundrymen of this district, for it is well known that about one-fourth of all the pig iron in the United States is made in this county, and that the Alabama iron can only reach Pittsburg by paying a freight rate of $4.35, while from the Virginia field a freight of $2.55 must be paid. When we look into this more particularly, however, we find that only one furnace is now making foundry iron for sale in this county, and that during 1902 the South produced 1,952,877 tons of foundry iron out of the 3,851,276 tons produced in the entire United States. In other words the South furnished 49 percent, or practically half of the total foundry iron produced in the United States.

Owing to the great variety of ores which extend through Virginia, Kentucky, Tennessee, North Carolina, Alabama and Texas the South produces a wide range of iron. In North Carolina the lowest phosphorus and sulphur iron, we believe, in the world is being made, running on an average .025 in phosphorus and sulphur.

In Alabama a low silicon iron averaging about .40 is produced, from which the highest grade of basic rails are now being turned out in the steel works of the Tennessee Coal, Iron & Railroad Co. These stand a greater punishment without fracture than the Bessemer rails generally used; in fact, a blow which will break a Bessemer rail will only bend a Southern basic one.

At the other extreme, there is produced in Virginia a 50 percent silicon iron, and further South an 80 percent manganese and a 20 percent phosphorus, so that you can readily see the wide range of irons which come from the Southern ores, running from low silicon up to 50 percent, in manganese .25 to .80 and in phosphorus .025 to 20 percent.

This wide range of ores was not at all appreciated when Southern pig iron was first marketed in the North, and all was sold under the one name of Southern iron. You can readily appreciate the trouble which the foundrymen had in trying to use irons widely different in chemical constitution but sold to them simply under the one name. This trouble, however, has been obviated, and the South today has a very close system of grading by fracture. By fracture Southern iron is sold under the following

grades, and while silicon is not guaranteed it usually runs about as follows:

No. 1 silvery, 4 to 5%.
No. 2 silvery, 3 to 4%.
No. 1 soft, 3%.
No. 1 foundry, 2.75%.
No. 2 soft, 2.50 to 2.75%.
No. 2 foundry, 2.35%.
No. 3 foundry, 1.90%.
No. 4 foundry, 1.75%, although it often runs much higher.
Gray forge, 1.35%.
Mottled, 1%.
White, .30%.

The silvery, soft and No. 4 foundry are distinctively Southern grades and are distinguished by the dense silvery appearance of the fracture, which to those not familiar with the Southern irons is so deceptive that foundrymen have added high silicon to them, thinking that the fracture denoted low instead of high silicon. As stated, the above silicons are merely approximate and no guarantee of the analysis is made when iron is sold by fracture. Some of the leading furnaces in the South, however, are also willing to sell strictly by analysis, guaranteeing as follows:

Silicon over 3 percent, sulphur not over .05.
Silicon 2.50 to 3 percent, sulphur not over .05.
Silicon to to 2.50 percent, sulphur not over .05 or .075.
Silicon 1.50 percent and under, sulphur not over .075.

These, of course, are the maximum sulphur contents, and the sulphur which is shipped ordinarily runs less than half of the sulphur guarantee.

In regard to using Southern iron, the standard Alabama grades ordinarily contain from .75 to .95 phosphorus, and as it is currently conceded that this percent of phosphorus does not materially weaken the pig these irons can be used for general work without any admixture of lower phosphorus iron. Where especially strong castings are required, results can be obtained by reducing the silicon, or using a lower phosphorus pig in your mix, which can also be secured from the South. In fact, at the foundry with which we were connected for many years, in addition to some 60,000 tons of pipe there were also cast some 20,000 tons yearly of high grade machinery and special castings without the admixture of any Northern iron. Of course, where you have iron made from Lake Superior ores to draw from, it is simpler to make your mixture partly with these; in fact, from our experience we believe best results are obtained in ordinary work by mixing irons made from different ores.

For instance, during the rush of a few years ago, when none of the furnaces were as careful as they should be in their grading, the Northern iron was deficient in silicon and higher silicons than usual were shipped from the South. At that time we visited one foundry which was using all Northern pig and found the arms of their flywheels cracking after they were cast, by reason of the low silicon in the mix; and a few squares away another foundryman using nothing but Southern iron was troubled by the brittleness of his castings, as his mixture was running over 4 percent in silicon. The trouble at these foundries was completely rectified by the one hauling some of its low silicon to the other and bringing back in exchange some of the high silicon. If each of the foundries had been using a mixture of Northern and Southern irons they would not have known that the analysis of each was so completely different from what they had ordinarily received.

Or course, in localities such as this where so much iron is produced from lake ores the demand is principally for the soft grade of Southern iron to take the shrinkage out of the mixture, and thus really strengthen the castings into which the iron is poured; but in addition, foundries are getting splendid results by the use of the lower grades of Southern iron in place of scrap, and to reduce the excess of graphite in heavy casting work. In addition to this the higher phosphorus Southern irons are particularly applicable for the castings of very light sections, such as stove plates, etc., as the higher phosphorus and silicon make the iron fluid and the castings very sharp and clean. Splendid results are also obtained with the 1 to 1.75 manganese Southern irons which reduces the sulphur and cleans the iron.

There is a growing demand for Southern iron, as the foundries are learning the advantages to be obtained from the use of higher phosphorus in their mixture; and they must now almost rely on the South for this, as the local Northern ore beds, which formerly supplied the phosphorus for the Scotch irons, are being pretty well worked out. And owing to the use of lower phosphorus irons in puddling, and the large amount of steel which is being rolled, the tap mill cinder and roll scale is not as high in phosphorus as formerly, and therefore cannot be used as successfully to bring up the phosphorus contents of the pig iron in the Northern blast furnaces.

In steel, as you are aware, every effort has been made for years to reduce the phosphorus contents, but in this the practice is also changing, and pig iron one-fifth of which is phosphorus is now added to the steel to purify it from dross, and to keep the sheets into which the steel is rolled from sticking together when passed through the rolls. In addition to this it is found that the plates are more easily cleaned and pickled for galvanizing, and in fact the steel is stronger with a limited amount of phosphorus added.

The change in feeling in regard to phosphorus is very striking. For instance, when we started in the iron business as chemist every article we read told of the trouble experienced with phosphorus, and we were greatly surprised after getting up a process for eliminating in the cupola about one-quarter of our phosphorus, to find that the iron was not as suitable for the work as it was before.

English Railmakers' Agreement.

The *Iron and Coal Trades Review*, London, announces that it learns on the best authority that as a result of the recent meeting held in London, the negotiations between rail makers of Great Britain, Germany, Belgium and France, have resulted in an understanding as to export orders. The agreement is based upon export sales amounting to 1,300,000 tons per annum and the allotment to each country is as follows:

	Participation per 100.
British works	53.50
German works	28.83
Belgian works	17.67
Total	100.00
French works—First year	4.8 parts out of 104.8 parts.
Second year	5.8 parts out of 105.8 parts.
Third year	6.4 parts out of 106.4 parts.

It will be observed that while the British, German and Belgian allotments are expressed in a unit of 100, the French works have their allotment added to this figure of 100, making the actual unit for the first year 104.8, rising to 106.4 at the end of the third year.

The Pittsburg, Bessemer & Lake Erie railroad, controlled by the United States Steel Corporation and built by the Carnegie Steel Co. to carry ore from Conneaut, O., to Pittsburg, has placed an order for 1,000 steel cars and ten locomotives. Orders have been issued to place the entire road in condition to care for a greater traffic next year than ever before.

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THE EUROPEAN RAIL AGREEMENT.

The rail pool which has probably by this time been ratified between the British, German, Belgian and French producers bears internal evidence that it will not tamely submit to American competition. It is based upon a total allotment of 1,300,000 tons of exports annually, yet the total exports of the pool members have never reached this figure, the nearest approach being 1,132,109 tons, in 1903. In that year the United States exported 30,656 tons, making a grand total of rail exports of 1,162,765 tons. Exports of all countries this year, judging by the record of the first eight months, promise to exceed slightly the fixed tonnage, and to be about 1,400,000 tons; but the important fact intervenes that the exports of the United States in the first nine months of this year have been 272,696 tons, or at the rate of 363,600 tons annually. Deducting this from the prospective total leaves a bare million tons for the pool members. It is true enough that an even half of the United States exports this year have been to Canada, and that the Canadian market, through the action of the new Canadian tariff, will be closed not only to American mills but to the foreign mills as well; but the result of this will be simply to decrease the world's market for steel rails, and to turn the attention of the American mills more to markets outside of North America. Africa is destined to become a larger rail consumer than it has been, a current estimate being that within the next six years 12,000 miles of railroad may be built on that continent; but this means only 2,000 miles a year, which with 60-lb. rails means some 200,000 tons annually, or an increase over previous consumption of much less than this.

The real plans of the foreign rail pool are of course not public property, but it is easy to see what would naturally be in the minds of the promoters. They have been smarting keenly under American competition for a year, one of their chief complaints being the recklessness of American competition, bids sometimes being made $5 under all others, when half this amount would easily capture the order. With this competition staring them in the face, they have carefully formed their pool, finishing it to the last degree by giving France a slightly increasing allotment, and placating one French interest by guaranteeing it a certain tonnage. The price, also, has been carefully fixed. It stands to reason that all this would not have been done without some clear cut plan to force American producers to enter the pool, or meet their aggressive competition. The price fixed, equivalent to about $20.70, f. o. b. shipping port, could clearly be underbid by American rail mills without departing from the quotations they have been making in the past twelve months, and the international pool's price is clearly a fiction unless something is done. Two alternatives are possible: (1) that a secret agreement has already been made with the American mills; (2) that the pool expects to force an agreement. The first alternative can probably be dismissed. The second means that pressure must be brought to bear. Considering the recklessness which the foreign rail makers charge against American competition it can hardly be that they expect to meet the American rail makers in the markets of the world. The American mills bid on rail inquiries from any part of the globe, and competition, already keen or this pool would not have been formed, would only be made worse by such tactics. It is rather more probable that the foreign pool has an idea of entering our domestic market. With an American price of $28, f. o. b. Eastern mill, with full freight to destination added, the foreigners would have no difficulty in getting into our Pacific coast trade by a quite moderate concession. The provisional pool price, $20.69 at foreign shipping port, plus the American duty of $7.84 would be $28.53. The ocean freight to Pacific coast points could easily be lower than our overland rail freight, thus admitting the foreign rails. Obviously if the foreign pool proposed to narrow competition to our domestic market it would be quite ready to make a concession from its ideal export price. It is the Western roads which have complained of the maintenance of the $28 rail price, and they would probably not be slow to place orders abroad, if only on even terms.

Indications in the iron market of late have been that no great reduction from the $28 price would be made. Domestic conditions, which some time ago may have pointed to a $24 price, are now much improved. A reduction to $26 would hardly remove the fear of foreign competition in the far West, and it now seems to be a question of the American mills either making a freight concession to the Western roads, or of making terms with the foreign rail pool. Otherwise there are likely to be quite interesting developments.

At a meeting of the directors of the Produce Exchange of New York, held last week, special rules covering dealings in pig iron futures were adopted. The rules were outlined in the Oct. 27 issue of *The Iron Trade Review*.

The Labor Situation.

NATIONAL FOUNDERS' ASSOCIATION.

What is expected to be a feature of the annual convention of the National Founders' Association is the dinner of the "Alumni," in other words the ex-members of the administrative council. Such a dinner has been held in an informal way heretofore, but that which is given in connection with the Cincinnati convention of the N. F. A. next week is referred to in the announcement as the "first annual dinner." It will be held at the St. Nicholas hotel, Cincinnati, on Tuesday evening, Nov. 14. The dinner of the association at large will be at the Grand Hotel on Wednesday evening, Nov. 15, at the close of the first day's proceedings of the convention. At the administrative council alumni dinner on Tuesday evening a report will be received from the committee on by-laws.

METAL TRADES ASSOCIATION NOTES.

CINCINNATI, Nov. 8.—The Chicago Metal Trades Association held a meeting on Monday evening, Nov. 7, at the Sherman House. Commissioner Eagan and Secretary Wuest, of the N. M. T. A., attended.

The Manufacturers' Association of Pittsburg reports calls for men to fill 15 vacancies. Eight of the positions have been filled by the association and men are being sent out to take the other openings as rapidly as possible. In the week ending Nov. 5, 27 applications for work were received by the association.

The regular monthly meeting of the new York Metal Trades Association will be held on Thursday, Nov. 10. A special meeting of the executive committee will be held the same afternoon. The method of conducting the employment bureau will be explained. The employment bureau will not be opened until after this meeting of the association.

It is reported that representatives of 12 labor unions with a total membership of 30,000 met Nov. 4 in New York and decided to form a new central body. Another meeting will be held next week when it is expected that representatives of other unions will be present and the new central body formally organized.

The annual meeting of the St. Louis Metal Trades Association will be held Nov. 23 at 2:30 p. m.

The St. Louis Metal Trades Association office is arranging for hotel accommodations in Cincinnati for those who intend to be present at the National Founders' Association convention which occurs Nov. 16 and 17 in that city.

The Citizens' Industrial Association of America will hold its second annual convention at New York, Nov. 29 and 30.

Since the change in the by-laws of the National Metal Trades Association, making the initiation fee for membership $25, there has been a decided increase in applications for membership.

LABOR NOTES.

The tonnage employes of the Illinois Steel Co. are reported to be preparing to resist an expected cut in their wages Jan. 1. The 400 employes have received no definite information, but the contract presented to the company has not been signed.

The employes of the Jeffersonville branch of the American Car & Foundry Co. have received notice of a reduction of 20 percent in the wages of some and that the services of others will be no longer needed.

Owing to a controversy between the molders of the Champion Iron Co. and its president, Dr. J. G. Carter, the foundry will be closed indefinitely. The company has sub-let a number of contracts which it had on hand. The announcement came as a complete surprise to the men.

Three mills of the Whitaker sheet mill of the Whitaker-Glessner Co., Wheeling, W. Va., were placed in operation this week. During the idleness of the plant the furnaces were rearranged and the engine repaired.

Iron and Steel Production in the United States in 1903.

From advance sheets of the annual statistical report of James M. Swank, general manager of the American Iron and Steel Association, we are enabled to give below a full summary of the production of iron and steel in various forms in the United States last year. In the table below a summary is given of the statistics for 1903 in comparison with those for 1902:

Subjects—Calendar years.	1902.	1903.
Production of Iron Ore, gross tons	35,554,135	35,019,308
Imports of Iron Ore, gross tons	1,165,470	980,440
Production of Bituminous Coal, gross tons	232,336,468	252,454,775
Production of Pennsylvania Anthracite, gross tons	36,940,710	66,613,454
Production of all kinds of Coal, gross tons	269,277,178	319,068,229
Shipments of Pennsylvania Anthracite, gross tons	31,200,890	59,362,831
Imports of Coal, gross tons	2,551,381	3,446,402
Exports of Coal, gross tons	6,126,946	8,312,098
Production of Coke, net tons	25,401,730	25,262,360
Production of Pig Iron, gross tons	17,821,307	18,009,252
Production of Spiegeleisen and Ferro-manganese, included in Pig Iron, gross tons	212,981	192,661
Production of Bessemer Steel, gross tons	9,138,363	8,592,829
Production of Open-hearth Steel, gross tons	5,687,729	5,829,911
Production of Crucible Steel, gross tons	112,772	102,434
Production of Blister and Patented Steel, gross tons	8,386	9,804
Production of all kinds of Steel, gross tons	14,947,250	14,534,978
Production of Open-hearth Steel Castings, gross tons	367,879	400,348
Production of all kinds of Steel Castings, gross tons	390,935	430,265
Production of Bessemer Steel Rails, gross tons	2,935,392	2,946,756
Production of Open-hearth Steel Rails, gross tons	6,629	45,054
Production of Iron Rails, gross tons	6,512	667
Production of all kinds of Rails, gross tons	2,947,933	2,992,477
Production of Structural Shapes, gross tons	1,300,526	1,095,813
Production of Iron and Steel Wire Rods, gross tons	1,574,293	1,503,455
Production of Plate and Sheet Iron and Steel, except Nail Plate, gross tons	2,665,409	2,509,665
Production of Iron and Steel Cut Nails and Cut Spikes, kegs of 100 pounds	1,633,762	1,435,893
Production of Iron and Steel Wire Nails, kegs of 100 pounds	10,982,246	9,631,661
Production of Bar, Bolt, Hoop, Skelp, Rolled Axles, Rolled Armor Plate, etc., gross tons	5,383,219	4,952,185
Production of all Rolled Iron and Steel, including Cut Nails and excluding Rails, gross tons	10,996,183	10,215,220
Production of all Rolled Iron and Steel, including both Cut Nails and Rails, gross tons	13,944,116	13,207,697
Production of Tinplates and Terne Plates, gross tons	360,000	480,000
Production of Ore, Pig, and Scrap Blooms for sale, gross tons	12,002	9,940
Value of Imports of Iron and Steel	$41,468,826	$41,255,864
Value of Exports of Iron and Steel	$97,892,036	$99,035,865
Miles of New Railroad built (revised figures)	5,063	4,715
Immigrants in the year ended December 31	739,289	937,371

Pig Iron Production and Consumption.

The production of pig iron in 1903, as already published, was 18,009,252 tons, being high water mark. The following table gives the total production of pig iron in the United States in 1901, 1902 and 1903 in gross tons:

Grades—Gross tons.	1901.	1902.	1903.
Bessemer and low-phos.	9,596,793	10,393,168	9,989,908
Basic (mineral fuel)	1,448,850	2,038,590	2,040,726
Forge	639,454	833,093	783,016
Foundry and high silicon	3,548,718	3,851,276	4,409,023
Malleable Bessemer	256,532	311,458	473,781
White, mottled and misc.	87,964	172,085	120,137
Spiegeleisen	231,822	168,408	156,700
Ferro-manganese	59,639	44,573	35,961
Direct castings	8,582	8,656	.....
Total	15,878,354	17,821,307	18,009,252

The Bessemer figures include low-phosphorus pig iron, that is, iron running below 0.04 percent in phosphorus. Pig iron containing from 0.04 to 0.10 percent of phosphorus is classified as Bessemer. The basic figures are confined strictly to pig

iron made with mineral fuel, and do not include the small quantity of basic iron that is annually made with charcoal, practically all of which is used by manufacturers of steel castings. A few thousand tons of castings direct from the furnace are included in the totals for white and mottled and miscellaneous grades of pig iron for 1903. Ferro-silicon and high silicon pig iron are included in the foundry figures.

Of the total production of pig iron in 1903 over 55.4 percent was Bessemer and low-phosphorus, as compared with over 58 percent in 1902; 24.4 percent was foundry, against 21.6 percent in 1902; over 11.3 percent was basic, against 11.4 percent. in 1902; 4.3 percent was forge, against 4.6 percent in 1902; 1.06 percent was spiegeleisen and ferro-manganese, against 1.19 percent in 1902; and 2.6 percent was malleable Bessemer, against 1.7 percent in 1902. The production of white and mottled and miscellaneous grades of pig iron and of castings made direct from the furnace amounted to a little over 1 percent in 1902 and to less than 1 percent in 1903. In 1903 the production of low-phosphorus pig iron amounted to 200,422 tons, aginst 164,246 tons in 1902. In 1903 it was made in New York, Pennsylvania, Tennessee and Ohio.

The consumption of pig iron in 1903 is approximated by adding together the domestic production, the imports and the stocks unsold on Jan. 1, 1903, and subtracting the sum of the year's exports and the stocks unsold at the end of the year. The former total is 18,658,777 tons, the imports being 599,574 tons and the stocks unsold Jan. 1, 49,951 tons. The stocks unsold Dec. 31 were 598,489 tons and the exports 20,379 tons, making the apparent consumption 18,039,909 tons, against 18,436,870 tons in 1902, 16,232,446 tons in 1901 and 13,177,409 tons in 1900.

Ferro-Manganese and Spiegeleisen.

Below are given the statistics of spiegeleisen and ferro-manganese by States in 1901, 1902 and 1903 in gross tons:

States—Gross tons	Spiegeleisen			Ferro-manganese		
	1901	1902	1903	1901	1902	1903
New Jersey	28,789	14,182	15,346	.....	.....	.....
Pennsylvania	133,986	99,383	76,493	57,408	44,453	34,871
Alabama	302	475	24	2,049	120	1,090
Illinois	60,297	45,801	57,955	182	.....	.....
Colorado	8,448	8,567	6,882	.....	.....	.....
Total	231,822	168,408	156,700	59,639	44,573	35,961

The figures given for ferro-manganese for 1902 include a small quantity of ferro-phosphorus made in one of the Southern States. Ferro-phosphorus was not reported for 1903. As a rule spiegeleisen contains from 9 to 22 percent of manganese and ferro-manganese from 45 to 82 percent. The standard for spiegeleison is 20 percent and for ferro it is 80 percent.

Production of Steel.

The total production of Bessemer steel ingots and castings in the United States in 1903 was 8,592,829 gross tons, against 9,138,363 tons in 1902, a decrease of 545,534 tons, or 5.9 percent; of open-hearth ingots and direct castings, 5,829,911 tons, against 5,687,729 tons in 1902, an increase of 142,182 tons or 2.4 percent. In the following table the production of all kinds of steel ingots and castings in 1903 is given by States, in gross tons. Of the total production 430,265 tons were direct steel castings:

States—Gross tons	Bessemer	Open-hearth	Crucible and miscellaneous	Total ingots and castings
Mass., Rhode Island, and Conn.	.....	169,209	2,385	171,594
New York and New Jersey	62,978	104,598	23,819	191,395
Pennsylvania	3,909,436	4,442,730	80,461	8,432,627
Del., Md., Va., W. Va., Dist. of Columbia, Ky., Tenn., and Ala.	735,406	180,241	50	935,697
Ohio	2,330,134	369,349	10	2,699,493
Indiana and Illinois	1,306,569	497,398	3,314	1,867,281
Mich., Wis., Minn., Missouri, Colorado, Oregon and California	168,306	66,386	2,199	236,891
Total	8,592,829	5,829,911	112,238	14,534,978

Production of All Kinds of Steel Castings.

In 1903 the production of all kinds of steel castings amounted to 430,265 gross tons, against 390,935 tons in 1902, 317,570 tons in 1901, 192,803 tons in 1900, 181,112 tons in 1899, and 131,937 tons in 1898. The increase in 1903 over 1902 was 39,330 tons, or over 10 percent. The following table gives by States the production of all kinds of steel castings in 1903.

States—Gross tons	Bessemer	Open-hearth	Crucible and miscellaneous	Total Gross tons
Mass., Conn., New York and N. J	6,337	36,094	5,827	48,258
Pennsylvania	1,620	182,021	2,068	185,715
Dist. of Col., Va., Tenn., Ala. and Ohio	1,414	54,270	10	55,694
Indiana, Illinois and Mich	5,704	108,296	1,714	115,714
Wis., Minn., Mo., Col., Oregon and Cal	3,018	19,667	2,199	24,884
Total	18,099	400,348	11,818	430 265

Of the total production of steel castings in 1903 Pennsylvania made over 43 percent, against over 39 percent in 1902; Illinois nearly 23 percent, against over 25 percent in 1902; and Ohio over 12 percent, against over 8 percent in 1902. No. other State made 5 percent in 1903 or 6 percent in 1902.

Production of All Kinds of Rails.

The maximum production of Bessemer steel rails was reached in 1903, when 2,946,756 gross tons were rolled, against 2,935,392 tons in 1902, an increase in 1903 of 11,364 tons. In the following table the production of Bessemer steel rails is given by States from 1898 to 1903. Rails rolled from purchased blooms, crop ends, and "seconds," and rerolled, or renewed rails are included. Renewed rails are rails that have been in use and are rolled down to smaller sections after reheating.

States Gross tons	1898	1899	1900	1901	1902	1903
Pennsylvania	1,053,326	1,224,807	1,195,255	1,406,008	1,148,425	1,186,284
Other States	423,376	1,045,778	1,188,399	1,464,808	1,786,967	1,760,472
Total	1,976,702	2,270,585	2,383.654	2,870,816	2,935,392	2,946,756

In addition to Pennsylvania the States which made Bessemer steel rails in 1903 were New York, New Jersey, Maryland, Ohio, Illinois, Wisconsin, Colorado and Wyoming. The production of Bessemer steel rails by the makers of Bessemer steel ingots, included above, amounted to 2,873,228 gross tons in 1903, 2,876,293 tons in 1902, 2,836,273 tons in 1901, 2,361,921 tons in 1900, 2,240,767 tons in 1899, and 1,955,427 tons in 1898.

Twenty-two plants rolled or rerolled Bessemer steel rails in 1903, of which 6 were located in Pennsylvania, 3 in Maryland, 5 in Ohio, 2 in Illinois, 2 in New York, and 1 each in New Jersey, Wisconsin, Colorado, and Wyoming.

The total production of open-hearth steel rails in the United States in 1903 was 45,054 gross tons, against 6,029 tons in 1902, 2,093 tons in 1901, and 1,333 tons in 1900. The maximum production of open-hearth rails was reached in 1903; the year of next highest production was 1881, when 22,515 tons were made. The production of iron rails in 1903 was 667 tons.

Production of Structural Shapes.

The statistics of iron and steel structural shapes embrace the production of beams, beam girders, zee bars, tees, channels, angles, and other structural forms, but they do not include plates or girders made from plates. Plates are provided for under other classifications, and in the general statistics of plates are included all plates cut to specifications. Practically all the structural shapes and plates used for structural

States—Gross tons	1902	1903	States Gross tons	1902	1903
Maine, New York and New Jersey	52,554	32,884	Indiana, Illinois and California	18,762	24,363
Pennsylvania	1,178,760	1,004,375			
Delaware, Alabama and Ohio	50,250	34,191	Total	1,300,326	1,095,813

purposes are made of steel. The total production of strictly structural shapes in 1903 was 1,095,813 tons, and in 1902 it was 1,300,326 tons. The production of structural shapes in 1902 and 1903 by States was as above.

Pensylvania made over 91 percent of the total production in 1903, against over 90 percent in 1902; Ohio 2.6 percent, against 3.7 percent in 1902.

Production of Wire Rods.

The production of iron and steel wire rods in the United States in 1903 amounted to 1,503,455 gross tons, against 1,574,293 tons in 1902, 1,365,934 tons in 1901, and 846,291 tons in 1900, showing a decrease of 70,838 tons in 1903 as compared with 1902, or almost 4.5 percent. Of the total production in 1903 1,503,425 tons were steel rods and 30 tons were iron rods; in 1902 the quantity of steel rods rolled was 1,574,087 tons and iron rods 206 tons. The following table gives the production of wire rods by States in the last four years:

States—Gross tons	1900	1901	1902	1903
Mass., Conn., R. I., N. Y. and N. J.	134,502	176,101	201,653	240,024
Pennsylvania	240,533	386,037	509,802	473,719
Kentucky, Alabama and Ohio	244,731	422,679	440,458	424,172
Indiana, Illinois and Colorado	226,525	381,117	422,380	365,540
Total	846,291	1,365,934	1,574,293	1,503,455

Pennsylvania made the largest quantity of wire rods in 1903, with Ohio second, Illinois third, Massachusetts fourth. Eight other States, Kentucky, Indiana, Connecticut, New York, New Jersey, Rhode Island, Alabama, and Colorado, also rolled wire rods in 1903 in the order named. With the exception of Colorado, which first rolled wire rods in July, 1903, all the States named also rolled wire rods in 1902.

Production of Wire and Cut Nails.

The production of wire nails in the United States in 1903 amounted to 9,631,661 kegs of 100 pounds, as compared with 10,982,246 kegs in 1902, a decrease of 1,350,585 kegs, or over 12 percent. The wire nails produced in 1903 were all made of steel, and were turned out by 57 works, as compared with 62 in 1902, 61 in 1901, 56 in 1900, and 59 in 1899. For 1903 it was necessary for the first time to estimate the production of two wire nail plants.

The following table gves the production of wire nails by States in 1901, 1902, and 1903, in kegs of 100 pounds.

States—Kegs of 100 pounds	1901	1902	1903
New Hamp., Mass., R. I. & Conn.	71,553	309,051	230,264
New York	136,118	132,854	190,524
Pennsylvania	3,118,508	4,219,604	3,918,272
Md., W. Virginia, Ky., Ala. & Ohio	3,633,894	3,251,918	2,589,310
Indiana and Illinois	2,716,748	2,902,006	2,367,820
Mich., Wis., Colorado & Califor'a	127,001	166,213	335,471
Total	9,803,822	10,982,246	9,631,661

The statistics of the production of iron and steel cut nails and cut spikes embrace only standard sizes of nails and spikes cut from plates. They do not embrace railroad and other spikes forged from bar iron, wire nails of any size, machine-made horseshoe nails, cut tacks, or hob, clout, basket, shoe, or other small sizes of nails. The production of cut nails and spikes cut from plates in 1903 was 1,435,893 kegs of 100 pounds each, against 1,633,762 kegs in 1902, a decrease of 197,869 kegs. In 1886 the maximum production of 8,160,973 kegs was reached. In 1903 the production of wire nails exceeded that of cut nails by 8,195,768 kegs, in 1902 by 9,348,484 kegs, in 1901 by 8,261,582 kegs, in 1900 by 5,660,485 kegs, in 1899 by 5,713,790 kegs, in 1898 by 5,846,254 kegs, and in 1897 by 6,890,446 kegs.

Production of Tin Plates and Terne Plates.

The following table gives the production of tinplates and terne plates in the United States from July 1, 1891, to December 31, 1903, the production in 1902 and 1903 being partly estimated from the best available sources of information. The production of tin dipping plants is included in all the figures that are given:

Calendar years	Gross tons	Calendar years	Gross tons
1891 (last six months)	999	1898	326,915
1892	18,803	1899	360,875
1893	55,182	1900	302,665
1894	74,260	1901	399,291
1895	113,666	1902	360,000
1896	160,362	1903	480,000
1897	256,598		

Production of all Rolled Iron and Steel.

The phrase rolled iron and steel includes all iron and steel rolled into finished forms. Forged armor plate, hammered axles, and other forgings are not included, nor such intermediate rolled forms as muck bars, billets, tinplate and sheet bars, etc.

The production of all iron and steel rolled into finished forms in the United States in 1903 was 13,207,697 gross tons, against 13,944,116 tons in 1902, the year of maximum production, a decrease of 736,419 tons, or over 5.2 percent. The increase in 1902 over 1901 amounted to 1,594,789 tons, or almost 13 percent. Twenty-five States rolled either iron or steel or both iron and steel in 1903, against 26 States in 1902. The following table gives the total production by States of all kinds of finished rolled iron and steel in 1902 and 1903, in gross tons.

States Gross tons	1902	1903	States Gross tons	1902	1903
Maine and Mass.	173,463	157,827	Ohio	2,019,952	1,883,643
R. I. and Conn.	95,200	131,182	Indiana	415,049	405,076
New York	181,443	255,905	Illinois	1,636,806	1,481,562
New Jersey	139,310	145,282	Michigan	89,297	77,593
Pennsylvania	7,642,636	7,171,982	Wisconsin	232,752	204,685
Delaware	61,409	47,673	Missouri	64,741	75,470
Maryland	339,773	372,009	Col. and Wy	200,771	169,409
Virginia	41, 29	43,631	Wash., Ore., and Cal	35,357	38,904
West Virginia	247,812	252,331			
Kentucky	170,320	158,280			
Tenn. and Ga.	25,398	23,208			
Alabama	131,298	112,245	Total	13,944,116	13,207,697

Pennsylvania made over 54 percent of the total production of rolled iron and steel in 1903, against almost 55 percent in 1902; Ohio over 14 percent and Illinois over 11 percent in each year; and Indiana over 3 percent in 1903, against almost 3 percent in 1902. No other State made over 2.9 percent in 1903 or over 2.5 percent in 1902. Maine, Minnesota, and Kansas, all three of which States have rolling mills, did not produce any rolled iron or steel in 1903, but Minnesota made a small quantity of direct steel castings in both 1902 and 1903. The single rolling mill in Maine, which was active for a short time in 1902, was destroyed by fire in August of that year. It was rebuilt in 1903 but not put in operation until October, 1904.

Production of Allegheny County.

The following table gives the number of built and building blast furnaces and completed rolling mills and steel works and the production in gross tons of pig iron and crude steel and of iron and steel rails and iron and steel structural shapes in Allegheny county, Pennsylvania, from 1900 to 1903.

Details—Gross tons	1900	1901	1902	1903
Furnaces built and building...No.	34	37	40	41
Production of pig iron	3,118,761	3,690,011	4,260,769	4,211,569
Rolling mills and steel works..No.	61	63	66	65
Production of Bessemer steel	2,318,871	2,883,595	3,094,175	2,748,833
Production of open hearth steel	1,680,249	2,199,191	2,503,245	2,604,349
Production of crucible and other steel	52,188	56,053	62,888	51,195
Total production of steel	4,051,308	5,138,839	5,660,308	5,404,377
Production of all kinds of rails	631,467	711,031	712,286	749,953
Production of structural shapes	475,572	617,308	773,144	689,849

Total Production of Rolled Iron and Steel.

The total production of iron and steel rolled into finished forms in the United States from 1887 to 1903 is given below.

Finished forms embrace all sizes of iron and steel rails, plate and sheet iron and steel, iron and steel plates for cut nails and cut spikes, wire rods, iron and steel structural shapes, bar, bolt, hoop, skelp, rolled axles, fish plates, and all other rolled products.

Yrs. gross tons	Iron and steel rails	Plates and sheets, except nail plate	Wire rods	Cut nails gross tons	Bars, hoops, shapes, and all other	Total Gross tons
1887	2,139,640	603,355	.....	308,432	2,184,279	5,235,706
1888	1,403,700	609,827	279,769	289,891	2,034,162	4,617,349
1889	1,522,204	716,496	363,851	259,409	2,374,968	5,236,928
1890	1,885,307	809,981	457,099	251,828	2,618,660	6,022,875
1891	1,307,176	678,927	536,607	223,312	2,644,941	5,390,963
1892	1,551,844	751,409	627,829	201,242	3,033,439	6,165,814
1893	1,136,458	674,345	537,272	136,113	2,491,497	4,975,685
1894	1,021,772	682,900	673,402	108,262	2,155,875	4,642,211
1895	1,306,135	901,459	791,130	95,085	3 005,765	6,189,574
1896	1,122,010	905,776	623,986	72,137	2,731,932	5,515,841
1897	1,647,892	1,207,286	970,736	94,054	3,081,760	7,001,728
1898	1,981,241	1,418,301	1,071,683	70,188	3,941,957	8,513,370
1899	2,272,700	1,905,505	1,036,398	85 015	4,986,801	10,284,419
1900	2,385,682	1,794,528	846,291	70,245	4,390,697	9,487,443
1901	2,874,639	2,254,425	1,365,934	68,850	5,785,479	12,349,327
1902	2,947,933	2,665,409	1.574,293	72,936	6,683,545	13,944,116
1903	2,992,477	2,599,665	1,503,455	64,102	6,047,998	13,207,697

Personal.

Officials of the National Tube Co. last week inspected the various plants controlled throughout Ohio, West Virginia and Pennsylvania. The party included W. B. Schiller, president; Edward Worcester, first vice president; John D. Culbertson, second vice president and treasurer; Taylor Alderdice, third vice president; Peter Boyd, general superintendent; C. E. Patterson, mechanical engineer; J. F. Townsend, traffic manager; J. F. Nicholson, Shelby Steel Tube Co.; F. H. Crockard, manager of the Riverside department, and G. C. Crawford, manager of the McKeesport plant.

Col. H. E. Fuhr, employed at the Bellaire, O., plant of the Carnegie Steel Co. during the past ten years, has resigned to accept the position of foreman of the electrical department of the United States Navy Yard at Boston, Mass.

Arthur M. Young, associated with the Jones & Laughlin Steel Co., Fittsburg, and with the National Tube Co.'s works, Wheeling, W. Va., for several years, has been appointed manager of the blast furnace department of Bolckow, Vaughan & Co., Ltd., Middlesbrough, Eng. This company is completing three blast furnaces built on lines conforming with American practice.

Henry E. Eberhardt, who was identified with Gould & Eberhardt, of Newark, N. J., for more than 35 years, as a member of the firm, chief designer and inventor, has resigned from the above company and is now associated with his sons in the Eberhardt Brothers Machine Co. of Newark, N. J.

Carl R. Briggs, who has been in the old material business in the Marquette building, Chicago, has accepted a position with the Chicago office of L. I. Bvegman & Co., Cleveland.

O. P. Letchworth, of the Pratt & Letchworth Co., Buffalo, presided at a Republican campaign meeting in that city on Oct. 29. He introduced Secretary Taft in a speech that voiced the satisfaction of the business interests of the country with existing conditions and their desire that no change be made in the national administration.

Andrew Carnegie has been unanimously re-elected lord rector of St. Andrew's University, Edinburgh.

The exhibit of woodworking and cooperage machinery of the E. & B. Holmes Machinery Co. of Buffalo, N. Y., has been awarded a grand prize at St. Louis. The company had some twenty machines on exhibition and its success in Machinery Hall is very gratifying.

The Ball Engine Co., Erie, Pa., has received an order for a 1000-h. p. horizontal cross compound Corliss engine for the Altoona shops of the Pennsylvania R. R.

The American Tour of the Iron and Steel Institute.

The climax of the Pittsburg entertainment of the visiting members of the Iron and Steel Institute was the banquet at the Westinghouse works at East Liberty on Wednesday evening, Nov. 2, following the trip through the works. In addition to the visitors and the Pittsburg engineers and representatives of iron and steel firms, there were present more than 100 guests of the Westinghouse company, who had been invited from various points in the Central West. The banquet was given in the largest aisle of the works of the Westinghouse Electric & Manufacturing Co., its length being one-third of a mile. The portion of the aisle set apart was decorated with flags of the United States and Great Britain. The lighting effect was beautiful, the Bremer lamps being strung from the ceiling and Cooper-Hewitt lamps suspended from the sides, the latter to make possible the taking of photographs. A unique souvenir was given to each person present, it being in the form of an induction motor and small enough in size to permit of its being carried in the pocket. Sir James Kitson, past president of the Institute, thanked the city of Pittsburg on behalf of Andrew Carnegie for the unusual kindnesses shown to the visiting manufacturers, and Mr. Westinghouse spoke of his great pleasure in being honored by the presence of visiting friends from abroad.

ST. LOUIS AND CHICAGO.

Under the arrangement for the division of the party at Pittsburg, those who chose to make the short trip took special train for Cleveland on Thursday, Nov. 3, leaving the Pennsylvania station at 1 o'clock. This party numbered about 120. Those who had selected the St. Louis trip went by special train from Pittsburg Thursday evening, the party being in charge of Albert Ladd Colby, of New York, and A. Edward Vaughan, who represented Secretary Dwight. The St. Louis party reached that city early Friday afternoon, Nov. 4, and their special Pullman sleeping car train was sidetracked near the main extrance to the Exposition grounds. The visits to the Exposition began at once, and Friday afternoon, Saturday and Monday were utilized to the fullest extent in an inspection of the interesting features of the fair.

The St. Louis party left at 11 o'clock Monday night, Nov. 7, and arrived in Chicago Tuesday morning, registering at the Auditorium Annex. The program for the day's sight-seeing and entertainment gave the visitors the option of a trip through the underground tunnels of the Illinois Telephone Co. a visit to the Union Stock Yards and meat packing plants, or the inspection of the plant of the Griffin Car Wheel Co. The members split up into three parties, and under proper guidance were taken to the places for which they had signified their preference. Those that took in the telephone tunnels also visited the Art Institute, and from there went to the leading retail store of the city, where luncheon was served. In the afternoon, this party embarked on a steamer and proceeded by river to the Fisk street station of the Commonwealth Electric Co. After the inspection of this plant, the trip by river was resumed to the McCormick Works of the International Harvester Co., and thence back to the city. In the evening the visitors were the guests of the local reception committee at the Studebaker Theatre, after which a supper was given in the Auditorium Palm Garden.

The program laid out for Wednesday included a visit to the South Works of the Illinois Steeel Co. These were thrown open for the inspection of the visitors, who were also the guests of the company at luncheon. While the gentlemen were on this trip, the ladies of the party were entertained by the Chicago ladies' reception committee with an automobile ride through the boulevards and parks, stopping for luncheon at the Washington Park Club House. All the guests were scheduled to leave for the East at 6 p. m. Wednesday.

The members of the Institute who took the Western trip included the following: W. E. Allen, H. Bauerman, L. Beiger, C. E. Bloomer, H. Butler, P. Chamfrault, J. T. Clyde, A. L. Colby and Mrs. Colby, Lieut. J. H Cowan and Miss Melvin, H Craddock, David Day and Mrs. Day, E. Dreux, C. K. Everitt, John Fellows, Sir Walter Foster, H. E. Hodgson and Mrs. Hodgson, Wm. Hodgson and Mrs. Hodgson, A. Horsfield, C. W. James, E. Peter Jones, R. W. Kennard, J. Little, D. A. Louis, M. Majery, J. Majery, H. Mecham and Mrs. Mecham, F. Noake, W. E. Oakley, A. S. Pye-Smith, J. Raine and Mrs. Raine, H. Kilburn Scott, A. G. Service and Mrs. Service, J. A. Schoebinger, E. Smith and Mrs. Smith, R. Snedden, R. Scharp, Herbert S. Thomas, Mr. and Mrs. Senior and Mrs. Edwinson, F. Timmerman, T. Turner, A. E. Vaughan, J. Verity, H. B. Weeks, Dr. A. Weiskopf and Mrs. Weiskopf, Joseph Wharton, W. Whitwell, F. H. Wigham and Mrs. Wigham, Walter Wood Jr., W. W. Wood Jr., J. Wood and Mrs. Wood, R. G. Woodward, F. D. Wild, R. Williamson, Fred Reynolds.

The executive committee of the Chicago reception committee included the following resident members of the Iron and Steel Institute: Robert W. Hunt, R. W. Hunt & Co., chairman; T. W. Robinson, second vice president Illinois Steel Co.; R. Forsyth, formerly with the Illinois Steel Co.; F. C. Baackes, general sales agent American Steel & Wire Co.; T. A. Griffin, president Griffin Wheel Co.; Guy R. Johnson, Illinois Steel Co.; E. C. Potter, formerly manager of the Illinois Steel Co. The general committee is as follows:

Robert W. Hunt, chairman; T. W. Robinson, E. A. S. Clarke, W. J. Chalmers, E. J. Buffington, Samuel Insull, Harold McCormick, Wm. L. Brown, Wm. L. Abbott, T. A. Griffin, Louis Mohr, T. J. Hyman, Richard Howe, E. L. Ryerson, C. P. Wheeler, W. R. Stirling, John Crerar, F. C. Baackes, A. W. Thompson, W. N. Coleman, George W. French, John S. Keefe, E. C. Lott, John G. Shedd, Alex. B. Scully, R. Forsyth, C. H. McCullough, John H. Mackenzie, August Ziesing, R. T. Crane Jr., E. A. Turner, H. G. Johnson, F. K. Copeland, F. A. Delano, C H. Ferry, A. W. Fiero, F. H. Foote, H. L. Hollis, Wm. Hoskins, George Merryweather, George S. Rice, Rudolph Ortman, W. A. Field, C. T. Boynton, Prentice Coonley, E. P. Bailey, E. C. Potter.

THE CLEVELAND VISIT.

The visitors to Cleveland arrived at the Euclid Avenue station of the Pennsylvania railroad at 4:30 Thursday afternoon. S. T. Wellman, H. W. Lash, R. W. Ney, F. G. Tallman and A. I. Findley had met the British party at Pittsburg and made the journey with them. Special trolley cars were provided at Cleveland, and the visitors were conveyed to the Hollenden Hotel, which was headquarters for the Cleveland visit. Thursday evening was given up to a rest, which was grateful after the somewhat strenuous exertions at Pittsburg. The Cleveland program was entered upon Friday morning. The visiting ladies, numbering 25, were taken in carriages by a committee of Cleveland ladies and gentlemen and shown some of the beauties of Cleveland's parks and boulevards. Luncheon was served at the Euclid Club, and later in the afternoon Mrs. S. T. Wellman gave a tea to the ladies at her home on Euclid avenue.

At the Newburg Works.

The inspection trip of Friday was to the Newburg works of the American Steel & Wire Co., a special train taking a party of 50 over the Cleveland & Pittsburg road. The open-hearth department of the works was first inspected. It has 6 Wellman rolling furnaces of 50 tons capacity each and one stationary furnace, giving a total daily output of 850 to 900 tons. One of the features of interest in this department was the use of movable ports, the advantages of which were a matter of inquiry by a number of visitors. The No. 1 blooming mill adjoining the open-hearth department takes care of all the open-hearth output and part of the steel from the Bessemer converters. This mill has an average output of 1,600 tons in 24 hours, but has made a record as high as 1,900 tons, and has rolled up to 100 tons in an hour. The new blooming mill, which is a 2-high, 35-inch mill, has an output of 950 tons a day and rolls only steel from the Bessemer department. The soaking pit capacity has been increased recently from 8 to 12 pits. The Bessemer mill has two 15-ton converters, and a feature here was a single post crane serving both converters. Its operations were both speedy and economical—racking in, turning and raising being accomplished simultaneously. Horizontal engines of the Southwark type furnished blast for the converters. In connection with the 35-inch mill, whose product is 4 x 4-in. billets, provisions for cooling billets so that they may be dropped at once into wooden cars were found to be unique. After being sheared the billets are conveyed to an elevated trough 150 feet long, filled with water. Emerging from the trough, they are dropped into cars. Hot billets pass by another conveyor to the rod mill heating furnaces, being carried overhead. A steel car standing under this conveyor receives crop ends. The billets shipped from the 35-inch mill go to the rod mills of the company on the north side of the city along the lake shore. These are the American, Consolidated and H. P. works.

The rod mill of the Newburg plant is noteworthy because it stands in the place of the first Garrett rod mill built in the United States. The reels in connection with the Belgian rod mill now operated at Newburg are a marked example of the automatic character of modern rod mill work. The plate upon which the rod is coiled is tilted, and the steel pins carrying the coil are automatically withdrawn through perforations in the plate, when the coiling operation has been completed. The bundle is thus permitted to slide down to the conveyor. Meantime there is no interruption of the motion of the coiling mechanism. From the conveyor hooks pick up the bundle automatically, and as it is carried by an elevated conveyor to the wire mill it has opportunity to cool more thoroughly, and is in better shape for drawing than when the coils are piled one upon another, as in the old method of conveying by car.

The pickling, cleaning, annealing and wire-drawing departments all presented features of interest. It is worthy of note that the Newburg works, with their connected blast furnaces and ore docks at the Central plant, represent the entire range of operations from the ore to No. 35 wire. Another blast furnace, the Emma, located near by, sends pig to the Newburg works and at the latter is a single survivor of the original group of Newburg furnaces. It is 62 x 16 ft., with old style stoves, and is hand filled, but still makes such an output and shows such economies as to fully warrant its continued operation as it stands.

What made a marked impression on all the visitors at Newburg was the cleaned-up condition of every part of the yard and mills. Whitewash and paint replaced the griminess commonly a feature at mills and furnaces, and the absence of unsightly piles of scattered scrap was commented upon. It was stated that this neatness was not the result of special preparation for the visit, but that cleanliness has been for some time a watchword at Steel Corporation plants, special attention to this point being insisted upon all along the line.

Luncheon was served in one of the warehouses of the plant, and in the early afternoon the party resumed their train for a trip to the Central furnaces via the Newburg & South Shore railway. This line is the property of the American Steel & Wire Co. and has nine miles of track. It was built last year primarily as a hot metal road leading from Central furnaces to Newburg. When the right of way was secured the company took up a large acreage on either side of the

track and besides securing needed ground for the dumping of its slag, has now ample room for important extensions in the way of steel works and blast furnaces whenever these are required. The first stop of the afternoon was at the Cleveland Furnace Co.'s plant. The coke ovens were not in operation, but the visitors had good opportunity to inspect the equipment of this modern foundry iron furnace and its ore unloading and stock facilities, as well as its excellent arrangements for hoisting and filling. Just before reaching Central furnaces the visitors inspected the railroad bridge over the Cuyahoga river. It was built by the Sherzer Rolling Lift Bridge Co., of Chicago, and has a movable span of 160 ft. The total length is 265 ft. The superstructure weighs 1,500 tons, the moving parts 1,225 tons, the counterweight 800 tons and the structural steel 700 tons. The bridge is designed to carry two 177½-ton locomotives followed by a uniform load of 5,000 lb. per lineal ft. on each track with safety factor of 5. The operating power is two 50-h. p. continuous current electric motors, the current being supplied from the Newburg works. The power actually employed in usual weather is 20 h. p.

At the Central furnaces the ore unloading machinery was in operation and its workings were watched with interest. A description of the unloading plants appeared in *The Iron Trade Review* of Nov. 3. The afternoon trip ended at the depot of the B. & O. railroad. On the entire day's round the visitors had the constant attention of J. W. Carpenter, superintendent of blast furnaces and steel works in the Pittsburg and Cleveland districts; R. W. Ney, district manager of wire mills; and H. A. Barren, manager of blast furnaces in Cleveland.

Complimentary Dinner.

On Friday evening the iron and steel interests of Cleveland gave a dinner in Chamber of Commerce hall to the visitors, and a departure was made from the custom of the annual dinners of the institute by inviting ladies. It was a most successful function, nearly 250 persons attending, divided about equally between hosts and visitors. At each of the round tables was a party of ten, Cleveland people alternating with their British friends. James H. Hoyt, of Cleveland, presided as toastmaster, and there were with him at the speaker's table E. Windsor Richards, E. P. Martin, Bennett H. Brough, Charles Kirchhoff, Hon. Theo. E. Burton, Theo. Dwight, S. T. Wellman, A. I. Findley, A. E. Brown, W. G. Mather, James Gayley, R. W. Ney, Ambrose Swasey and D. G. Kerr. The menu cover bore a design representing a British and an American steel worker clasping hands in front of a turned down converter from which metal was being poured. The British lion and American eagle looked down upon the friendly mingling of the two artisans and between was the legend, "Welcome to Cleveland."

Toastmaster Hoyt proposed toasts to King Edward and to President Roosevelt which were drunk with enthusiasm, as the national airs were played. In his remarks introducing the speech-making, and in presenting the speakers, Mr. Hoyt was peculiarly happy. Secretary Bennett H. Brough, in responding to "Fourteen Years After," referred to the changes in the American iron trade since the visit of the Institute in 1890 as having been ably presented in the article by B. E. V. Luty in *The Iron Trade Review* of Oct. 27, and in view of that article confined himself to brief reference to some of the more important developments. His remarks were spiced with humor and were warmly received. Two other toasts responded to by members of the Institute were the following: "Cleveland—A Name of Good History and Prophecy in the Iron Trades of Two Countries," response by E. Windsor Richards; and "The Future of the World's Iron Trade—Competition or Co-operation, Which?" the response to this being by E. P. Martin. Mr. Richards told of early iron making in Cleveland, Eng., and spoke of his knowledge of the Cleveland, O., district, gained in repeated trips to the United States in the past 25 years. He took occasion to bid farewell to his American friends who had received him so kindly on all occasions and spoke of the present as his last trip to the United States. An interesting feature of Mr. Richards' remarks was his reference to the blast furnaces his company (Bolckow, Vaughan & Co., Ltd.) was now building on American lines, under American engineering direction, equipped with American engines, boilers, skip hoists, etc. They would have an American manager, assisted by two foremen taken from this country. Instead of the present output of 700 tons a week per furnace it was the hope that the new furnaces, one of which would be started about Jan. 1, would turn out about 2,000 tons each.

Representing the American contingent three responses were given, C. Kirchhoff, chairman of the American executive committee, speaking on the "Personal Factor in the Industrial Problem." He referred to the varied elements in British life which made welding the problem there, while on this side the problem was rather one of segregation. Everywhere in industry the demand for capable men is insistent, and the speaker expressed confidence that the right man would always be found to fit the occasion. Congressman Theo. E. Burton, of Cleveland, spoke eloquently of "The Disappearing Barriers Between Nations," and his appeal for the co-operation of the manufacturers present from two continents, in the rebuilding of the temple of international concord, was responded to with approval.

In the absence of John Birkinbine, of Philadelphia, who was to have responded to the toast "The Lake Region as a Factor in American Development," James Gayley, first vice president of the United States Steel Corporation, was called upon, and his familarity with the ore trade and the strides made in lake commerce in recent years, enabled him to present vividly the contrasts between the old and the modern. He gave facts illustrating the marvelous growth of the traffic of the lakes and his statements as to the cheapness of the lake haul on ore were astonishing to his British hearers. A summary of Mr. Gayley's remarks follows:

Of the iron ore mined in the United States, the Lake Superior regions now furnish about 75 percent. Fifty years ago the first year's shipment of Lake Superior ore amounted to 1,500 tons. Twenty years ago a season's shipment was only 1,000,000 tons, while the average of the past two years has been 25,000,000 tons. Considering the rate of progress made in recent years, the speaker considered it within bounds to look for a total shipment of 45,000,000 tons in a single season in the next ten years.

Notwithstanding many of the Lake Superior mines are a thousand miles from the blast furnaces of the Central-West, ore can be delivered at lower lake ports at the unparalled rate of 8-10 of a mill per ton per mile, this extreme cheapness of transportation being the product of a rapid development in facilities for lake transport and a refinement in economy due to the engineering progress of recent years in all the operations connected with lake traffic. Forty years ago boats were loaded laboriously, and on arriving at lower lake ports were unloaded by hoisting the ore to the deck with horsepower, transferring it to wheelbarrows, from which lines of men dumped it upon the ore piles or into cars. This year the steamer "Wolvin," carrying 10,300 tons of ore, was loaded in two hours at upper lake ports, and the cargo unloaded on Lake Erie docks in four and a half hours. The traffic of the Soo canal is equal, in two and a half months of the navigation season (which is seven months in all) to the total traffic of the Suez canal for an entire year. The port of Duluth, which a few decades ago was celebrated in a speech in Congress that was received rather as a piece of humor than as a prediction that would be in any measure realized, has now a greater tonnage than Liverpool and New York, its traffic representing coal for the great Northwest, grain coming therefrom, be-

sides lumber from the same regions and the enormous tonnage of iron ore since the discovery of the Mesabi range in Minnesota.

The wonderful results in the increase of tonnage on the lakes and the cheapening of the freight rate have been accomplished by the skill, the aggressiveness and the daring of our engineers, who have simplified transportation and replaced much of the dehumanizing hand labor by unloading with machines of marvelous capacity. It is to be remembered, however, that the engineer in these exploits has had the cooperation of progressive and aggressive capitalists, the combination of engineering skill and business foresight accomplishing what neither engineer nor business man could have undertaken without the aid of the other. It is the business man of courage and insight who makes possible the realization of the schemes of the engineer.

The speaker referred to the coincidence of the establishment of the first iron works in Cleveland in the same year in which Neilson gave to the world his hot blast. The results which have flowed from the two have been great and far-reaching. Referring to the greatness of the present industrial era, and to its promise as even greater than its achievement, the speaker attributed much of it all to the Great Lakes, which have cheapened the cost of steel, enriched the whole country, and thus have contributed vastly to the peace and civilization of the world.

To Conneaut and Buffalo.

Saturday morning was given up to group trips to various Cleveland industries, the larger parties going to the Brown Hoisting Machinery Co.'s shops, the Wellman-Seaver-Morgan Co. works, Case School of Applied Science and the Otis Steel Works. At 1:30 p. m. the special train was taken again and the return trip to the East begun. At Conneaut, O., a stop of two hours was made. In spite of rain and sleet the party entered with much interest upon the program arranged by Manager R. R. Richardson, of the Pittsburg & Conneaut Dock Co., who has provided tugs for a tour of the harbor. Later the work of the Hulett ore-unloading plant and of the Brown electrical machines was studied with interest, Conneaut presenting the greatest array of ore-unloading equipment the British engineers had seen on their trip. A souvenir booklet was distributed by the dock management. It was entitled "Growth of the Ore Trade," and gave the story of the evolution of the lake carrier and the important part played by the ore trade of the lakes.

Buffalo was reached Saturday evening, and Sunday and Monday were given up to rest and sight-seeing. The trip to Niagara Falls was the chief attraction, and the works visited included the plants of the Lackawanna Steel Co. and the Buffalo & Susquehanna Iron Co. The last stage of the return trip was begun Tuesday morning and New York was reached Tuesday evening. Some of the visitors sailed on Wednesday. Others will remain until Saturday.

New Railway Equipment.

It is stated that the American Car & Foundry Co. received in the month of October orders for over 13,000 new cars, which compares with orders for about 4,000 in September, about 3,000 in August and 2,000 in July. October was one of the best months in the history of the company.

The following companies have ordered cars from the American Car & Foundry Co.: American Cotton Oil Co., 50 freight cars; Chesapeake & Ohio Railway Co., 22 cabooses. The Pullman Co. is asking bids on special equipment for 500 refrigerator cars. The Pressed Steel Car Co. has received an order from the Oak Ridge Coal & Coke Co. for 50 freight cars, and the Pittsbur, Bessemer & Lake Erie Road has ordered 1,000 steel freight cars. It is reported that the Louisville & Nashville Co. is about to construct 1,000 freight cars at its own shops. The Inter-Colonial Railway of Canada has ordered 100 flat cars, 100 box cars and 26 coaches. The Northern Pacific Railway Co. will soon ask bids on 500 additional stock cars. The American Engineering Works, Chicago, are asking bids on 100 standard gauge side dump stripping cars. The Central Railroad Co. of New Jersey has ordered 30 passenger coaches. The Grand Trunk Railway Co. has ordered 25 mogul locomotives.

Production of Furnaces Using Lake Ores.

J. G. Butler Jr., of Youngstown, O., chairman of the Bessemer Pig Iron Association, announces that on Nov. 1, 187 furnaces using Lake Superor ore reported to the association. Of this number 131 are in blast, and 56 out of blast. The furnaces in blast represent a daily capacity of 41,515 tons, and the furnaces out of blast a daily capacity of 13,225 tons. The capacity in blast Nov. 1 was 75 percent, and the capacity out of blast, 25 percent. The idle capacity from the beginning of the year 1904 is as follows:

January 1, 64½ percent.	July 1, 35 percent.
February 1, 38 percent.	August 1, 41 percent.
March 1, 28 percent.	September 1, 28 percent.
April 1, 14½ percent.	October 1, 26 percent.
May 1, 10½ percent.	November 1, 25 percent.
June 1, 20 percent.	

There was thus a gain of 1 percent in the active capacity in October.

A deal for the purchase of the Kloman mine at Republic, Mich., will probably be closed by the Flagler Iron & Steel Co., of Chicago. The Kloman has not been operated for 20 years and during that time its openings have been deserted and filled with water. According to the proposed agreement the company will be given a limited time in which to get the property unwatered and it is expected the installation of pumps will begin at an early date. The ore bodies are fairly well defined, but exploratory work will doubtless be undertaken. William Dickinson, a representative of the company, has looked over conditions at Republic and officers of the company will visit the property.

The Scottdale furnace of Corrigan, McKinney & Co., Scottdale, Pa., was blown out this week for repairs. The stack is to be increased in capacity, the stack being increased in size from 67 to 80 feet. Hand filling will be continued, however, and no skip hoist will be erected. The tendency has been to continue with hand fillers at furnaces producing foundry and forge iron, and a number of stacks producing these grades have made extensive repairs this year without including the automatic skip. Operators making this decision claim that a better distribution of stock can be made by hand than by machine filling.

The plate mill of the Cambria Steel Co., Johnstown, Pa., is now operating double turn. During the past six months this mill has only operated single turn.

The four converters in the Bessemer department of the Homestead Steel Works of the Carnegie Steel Co. are in operation this week for the first time in several months. Until this week the plant has operated at half capacity, with only two converters in operation.

The Leetonia, O., stack of the Cherry Valley Iron Co. was blown in last week after an extended idleness. The furnace was entirely rebuilt and the output increased from 300 to 400 tons daily. Three McClure stoves were installed last year and new blowing engines added, so that the entire plant has been practically rebuilt since it has come under the ownership of this company.

TRADE PUBLICATIONS.

The New York Belting & Packing Co., Ltd., with offices on Chambers street, New York, has issued a folder describing various forms of packing and setting forth the advantages.

Dean Bros. Steam Pump Works, of Indianapolis, Ind., have a new catalogue describing condensing apparatus. The pamphlet gives much information concerning this class of machinery and will facilitate the solution of condensing problems.

The Atlas Car & Mfg. Co., of Cleveland, sends a 100-page catalogue illustrating dumping and light cars for narrow gauge tracks. The catalogue also illustrates slag and metal ladles, core oven racks and cars, turntables, transfer tables and railroad track specialties such as frogs, crossings, etc.

The Rand Drill Co., of Broadway, New York, issues a circular descriptive of pneumatic tools. The circular has illustrations of the tools in use for many purposes, shows how they can be used in confined places, and gives apt facts and figures relating to air driven equipment.

The Hancock Inspirator Co., with offices at Liberty street, New York, and South Canal street, Chicago, has a catalogue which is not only a good example of the printer's skill, but contains a considerable amount of extremely interesting reading. Of course the body of the catalogue describes the product and in the first part there is a description of the plant where the goods are made and a historical sketch of the company. This portion of the work affords an insight into the careful methods pursued by the management and anyone interested in manufacturing lines may glean many items of value from the perusal of such an account. The plant was freely described and its features discussed in *The Iron Trade Review* of June 2, 1904.

The Bristol Co., of Waterbury, Conn., describes the Bristol volt, ampere and watt meters in a recent catalogue. The pamphlet contains a number of charts, tables, etc., and shows how the instruments can be applied for the control and record of various conditions about a manufacturing plant.

The Jones & Laughlin Steel Co., Pittsburg, has issued a handsomely illustrated catalogue and price list of its patent cold rolled steel shafting, couplings, bearings, pulleys, rope sheaves, etc., containing 208 pages. Widely known as a producer of the heavier steel shapes and as the largest independent steel producer in the United States, the company is also the largest single producer of shafting, couplings, bearings, pulleys and other power transmission accessories. The catalogue is one of the most complete ever published, devoted exclusively to power transmission accessories, and its numerous tables and formulas make it invaluable to the engineer as a work of reference. The cold rolling mill and foundry of the Jones & Laughlin Steel Co. are located on the South Side, Pittsburg, the former producing the shafting and the latter being devoted to the casting of the pulleys, etc., of which this catalogue treats. This company is the pioneer in cold rolled shafting, having been engaged in its manufacture for more than forty years. Attention is also called to the cold rolled steel axles for electric street railway use. These axles are now in use with success on many roads throughout the country. They are strong and tough and at the same time so ductile that the heavy and persistent blows received from the motors, the undue stress produced by the overloading of cars, and the violent surges due to the sudden application of brakes, do not crystallize and break them.

The patent bearings made by the Scheiffler Roller Bearing Co., of Jackson, Mich., are neatly illustrated in Circular No. 8. The firm makes a complete line of ball and socket pillow blocks and adjustable drop and post hangers. These are double braced and of the split or parting type for ready attachment to journals.

A circular from the Abendroth & Root Mfg. Co., of Newburg, N. Y., enumerates the riveted pipe, sheet iron work, smoke stacks, tanks, etc., made up by the company in plain, asphalted or galvanized finish. The printed matter has a card bearing the name and address of the recipient and a request for new price list and handbook. This requires a stamp only and is then ready for remailing to the firm at Newburg. The circular will fit a 4 x 6 in. card index or can be cut along a red line to 3 x 5 in. It includes only material manufactured at the Newburg plant.

Something Pneumatic, the monthly publication of the Chicago Pneumatic Tool Co., of Chicago, has in the latest issue an illustrated article on pneumatic tools for eastern countries. Photographs of coolies handling locomotive work on Indian railways are reproduced. There is also a reproduction and translation of a letter of thanks from the president of the National Industrial Exhibition of Japan, relative to an exhibit of the Chicago Pneumatic Tool Co.

The solid extended knee now adopted on the milling machines of the Garvin Machine Co., of New York, is the most prominent feature of a small pamphlet of recent date. This improvement, the invention of George K. Garvin, was described at length in *The Iron Trade Review* of May 5. There are four comparative views of the designs of knees for 1862, 1881, 1897 and 1899. These are grouped on a single page and the 1904 type is illustrated in detail elsewhere. The earliest design had openings in top and front with large slots through the sides. The later designs reduced the opening at top by carrying inward the ribs from the sides, closed the side slots and also used square gibbing with a view to avoiding any wedge action of the V-shaped gibs. The bearing surface was next extended and the knee enclosed. The hand wheels are brought to the front of knee, saddle has a taper gib fit on knee, tightener applied to feed cone pulley bracket, there is a two-way vise and other items of note on the present line of milling machines.

New Books.

"Dimensions of Pipe Fittings and Valves," by W. D. Browning, is published by the *Draftsman*, Cleveland. Flexible cloth, $.50 and flexible leatherette, $.75. Designers are familiar with the difficulties of laying out pipe and selecting fittings, especially when it is necessary to arrange piping for confined spaces and accurately determine the fit of the various pieces. The old way drives the draftsman with his sketching tablet, calipers and rule into the stock room or shop. There he hunts up the fitting, makes a detailed sketch and then works it into his drawing. This takes times, and the designer may find he has had a special in place of a standard fitting. Possibly the fitting he wants is not in stock at all and he has simply to make a guess at it. Mr. Browning has collected data concerning all styles of pipe and fittings and combined this information into a very useful book. It is a good thing to have within easy reach.

"Untechnical Addresses on Technical Subjects," by James Douglas, is a 5 x 7-in. book of some 90 pages. The contents treat of the characteristics and conditions of the technical progress of the nineteenth century; the development of American mining and metallurgy, the equipments of a training school and wastes in mining and metallurgy. The addresses were given by the author when officiating as president of the American Institute of Mining Engineers at California in 1902, before the School of Mines and Metallurgy of the University of Missouri and the Michigan School of Mines. The volume has been brought to date by a number of additions at various points and the buoyant hopefulness and breadth of the author's comments will give zest to his semi-popular treatment of technological matters. He brings out very clearly the close parallel of railroad expansion with pig iron production and here as elsewhere has an intimate insight and acquaintance with causes and events in metallurgical progress. The book preserves the platform influence in a marked degree and is evidently from an accurate record of the speaker's efforts. The work is well bound in cloth and published by John Wiley & Sons, 43-45 East Nineteenth street, New York. Price, $1.

THE BERGER MFG. CO.'S EXHIBIT.

The booth of the Berger Mfg. Co., of Canton, O., at the St. Louis Exposition, is located in block 9 of the Varied Industries building. The characteristic feature of the exhibit is that the entire booth is made of sheet metal produced in the works of this company. The structure is of the Doric style of architecture, with columns, etc. The interior consists of the well known Berger "Classik" ceilings and side walls finished in ivory white and the columns are in imitation of Italian marble, with capitals in silver. The scheme of the interior finish sets off the beauty and harmonious possibilities in colors which can be secured through the use of Berger's "Classik" ceilings and side walls. The exhibit shown in the booth consists exclusively of metal furniture manufactured by the Berger company, and includes document files, vertical files, card index cases, vault omnibuses, etc.

EXHIBIT OF THE BERGER MFG. CO. AT ST. LOUIS.

Prizes Awarded at the World's Fair.

Pittsburg steel cars have been awarded the grand prize in the exhibition at the World's Fair at St. Louis. The Pressed Steel Car Co. made an exhibit of four cars. One is a Pennsylvania Railroad standard gondola, 40 ft. long and weighing 39,400 pounds. Another is a pressed steel side dump gondola built on an entirely new design. It is 41 ft. 6 in. long, the whole bottom of the car consisting of drop doors so arranged that the whole load can be dropped at either side of the track, while the doors, when closed, give the car an entirely flat bottom for shoveling out. The third is a box car entirely new in design with structural steel underframing and steel superstructure. It weighs 40,000 pounds. The fourth is an improved steel flat car with wooden floor.

The E. W. Bliss Co., Brooklyn, N. Y., manufacturer of presses, dies and special machinery, has been granted the grand prize and gold medal for tools and machines exhibited at the Exposition. The awards were for superiority of workmanship, smoothness of action, ingenuity displayed in design and highest quality of product.

The Gisholt Machine Co., Madison, Wis., engineer and manufacturer, has been awarded a grand prize at the World's Fair.

The Westinghouse Companies have been awarded the special prize in the department of machinery for the best, most complete and most attractive installation. Twelve grand prizes have been awarded these companies, eight being for gold medals and four for silver medals.

The Franklin Institute has conferred the Elliott Cresson medal upon Dr. Hans Goldschmidt, the inventor of thermit. The Goldschmidt Thermit Co., of New York, has been awarded a grand prize at St. Louis and the complete exhibit in the Metals Pavilion is made highly interesting by the daily demonstrations of welding. Since the company installed a plant in this country for the manufacture of thermit the welding of trolley rails has assumed greater importance and trial orders have been received from a number of cities.

The Drawback on Tin Plates.

We eanestly approve the demand of our tin plate manufactures for the abrogation of so much of the drawback provision of the tariff of 1897 as applies to tin plates. The original reason for this application of the drawback provision, which provision has been embodied in all our recent tariffs, has ceased to exist. When a tin plate industry had no existence in this country the extension of the drawback privilege to the shippers abroad of petroleum, canned meats and vegetables, canned fruits, fish, oysters, etc., was justified because tin plates of domestic manufacture could not be obtained, and the duty paid on imported tin plates which afterwards exported in manufactured forms, if it had been retained in the treasury, would have been a check upon our foreign trade. But this country is now not only able to supply tin plates in sufficient quantities to meet all domestic demands, both for home use and export, but it can do this at prices very much lower than those which prevailed when our exporters of canned goods were compelled to buy foreign tin plates. Fair play and the public welfare would seem, therefore, to demand that hereafter the exporters of canned goods should not be paid a bounty out of the United States treasury to induce them to use foreign tin plates. If exporters of such goods should prefer to continue to use imported tin plates they should be required to pay the same duty as other importers of tin plates, with no benefit of drawback. The treasury would gain in needed revenue. Furthermore, it has been represented that it is easy to commit frauds upon the revenue under the drawback provision, so far at least as it relates to tin plates, and in this representation lies an additional reason for the abrogation of this provision to the extent that we have suggested.—[Bulletin of the American Iron and Steel Association.

The United States Cast Iron Pipe & Foundry Co. has declared its regular quarterly dividend of 1¼ percent, payable Dec. 1.

PRESIDENT OF LACKAWANNA STEEL CO.

E. A. S. Clarke, the newly elected president of the Lackawanna Steel Co., whose portrait is shown herewith, has been identified with the iron industry for twenty years. He graduated from Harvard University in 1884, and in September of that year started work in the testing laboratory of the Spang Steel & Iron Co., Pittsburg, under Robert Forsyth. In January, 1885, he went to Chicago to accept a similar position at the Bridgeport works of the Union Steel Co. After the merger of this company with the Illinois Steel Co. in 1889, Mr Clarke was appointed assistant superintendent of the Union Steel Co.'s plant. In October, 1891, he was transferred to the South Works of the Illinois Steel Co., as assistant superintendent, becoming general superintendent on Jan. 1, 1896. He continued in this capacity until January, 1899, when he succeeded W. R. Walker as general manager of the Illinois Steel Co. On Nov. 15 of the same year, Mr. Clarke resigned this position to become manager of manufacturing of the Deering Harvester Co., which duties he assumed March 15, 1900, after making a trip abroad. Afterwards, when the International

E. A. S. CLARKE.

Harvester Co. was formed, Mr. Clarke was made general manager of manufacturing of all the plants of the constituent companies. During 1902-3, he had entire charge of the designing and construction of the blast furnaces, steel works and rolling mill built by the Harvester company at South Deering. He also negotiated the purchase of all the company's ore and coal lands.

The extent of the equipment in a modern building is strikingly presented by the new Wanamaker structure in Philadelphia. Some 25 miles of 1-in. steam pipe will be used in the hot blast heating and tempering coils. This pipe is being manufactured into 111 heater sections. In connection with these heaters and in other parts of the building 28 fans will be used, the largest of these having a housing 220 in. high and the smallest 50 in. The apparatus, which is now being constructed in the American Blower Co.'s factory at Detroit, will make a ten carload shipment.

The Eastern Machinery Market.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, NO. 150 NASSAU ST., NEW YORK, Nov. 7.

The machinery market in this vicinity during October was marked by a slight improvement over September. Purchases of small amounts, with each day giving a good account of itself, and making up excellent monthly totals, were the rule. This is the kind of trade that has not been in evidence much this year, and its appearance now is taken to mean that the machinery world will soon witness a change for the better. This was confirmed by the substantial increase which took place in the number of inquiries during the month, and which are expected to yield some good orders in the near future. Another hopeful development of the month was the assurance which purchasing agents of railroads gave to the representatives of machinery houses who called on them, that many machinery propositions with them that have been hanging fire for sometime would reach the trade, at least in a moderate way, before November shall have passed.

In machinery tools orders for the past month were almost exclusively confined to small lots, but made up a fair monthly business in the aggregate. Outside of the purchase by the Erie Railroad of some $100,000 worth of tools, the order for which was taken by the Niles-Bement-Pond Co., and of a large order given out by the Japanese government, there were no contracts of any magnitude placed. It is the trade which is confined to the purchase at regular intervals of one or two tools at a time that the generality of machine tool houses prefer, and it was this kind of trade that the past few weeks witnessed. Outside of what has already been noted, the railroads did not enter the market during the past month. Definite news as to where the Pennsylvania road will purchase in any quantity is still unobtainable, and the Philadelphia and Reading and Lehigh Valley are still to be heard from with the specifications they have out. Prices of machine tools are now firmer than they have been this year, with the possible exception of lathes, in which concessions of from 5 to 10 percent have been made recently. The business represented in the reductions was not large.

In engines and boilers October was rather quiet. With the majority of manufacturers orders did not come up to the previous month's totals, for which the impending presidential election was blamed. There is considerable estimating being done, however, especially for small manufacturing establishments, and many of the latter will place orders for power equipment if general business conditions improve, as is confidently expected, when election is over. During the past month there were no orders for large horse power placed, contracts taken being invariably for from 100 to 300 horse power. In boilers October's business was without any particular change from that done for several months previous, unless it be that the outlook is much brighter now than it has been.

Electrical machinery manufacturers seen reported only a fair business for October. Their orders were not as numerous as September, which was a good month with them. They attribute the dull condition of trade recently to the gradual falling off in new construction which generally sets in at this time of the year. Current orders are made up of small lots, and the competition for these is so keen that prices have suffered somewhat. Still the cutting is not of an extensive character, and it would not take much of an improvement in trade to impart firmness to prices. In power transmitting machinery the past month was characterized by a steady trade, with new specifications coming in more freely, Woodworking machinery was in fair demand with orders covering a wider territory than usual. Among manufacturers of machinists' contractors', and engineers' supplies,

October was a continuation of the normal trade of the past few months.

The foreign machinery trade for the past month was a little better than for September, with no special business developing. Improving conditions are reported in machine tools, pneumatic tools, and general machinery.

The Niles-Bement-Pond Co. says its October business was very satisfactory. Outside of the Erie order already mentioned, it booked several good sized orders as well from railroads and industrial establishments. It notes that as the year draws to a close buyers display less hesitancy in making purchases. The company is confident that a decided improvement in trade will come with the new year.

Manning, Maxwell & Moore had a good month's business, especially in cranes, in which orders took a decided brace. The firm notes an appreciable increase in inquiries, with closing much easier than it has been.

The Prentiss Tool & Supply Co. had a steady trade during October, with small sales making up a good monthly aggregate. It looks on the immediate outlook for business in machine tools as more promising than at any time during the present year.

James McCabe says his October business was about the same as it has been for months past. He doesn't look for better trade in machine tools before the new year.

Hill, Clarke & Co.'s local office did a fair trade during the past month, booking some good orders for boring mills especially.

The Van Dyck-Churchill Co. reports its October orders for machine tools to be better than for the month previous. Its inquiries were more numerous also.

Paul Bigelow, representing the Buckeye Engine Co., closed some excellent orders during the past month, among them being one 250-horse power simple engine for the Orford Copper Co., Bayoune, N. J., and one 225-h. p. compound engine for the Bethel Electric Co., Bethel, Conn. Mr. Bigelow says that general business conditions were much better during the last ten days of October than they were for all the days in the month previous.

W. B. Mayo, representing the Hooven, Owens, Rentschler Co., booked some fair orders for engines during the past month, with the outlook for better trade looking up.

Thayer & Co., Inc., steam boilers, had a good trade during October. They report some excellent propositions in shape for early closing.

The Ingersoll-Sergeant Co. continues to book some excellent business. Its domestic trade is now better than at any time during the present year, and its foreign orders have increased in number during the past month also.

The Rand Drill Co. notes an increasing demand for its specialties during the past few weeks. Not in a year has it had so many orders on its books as at present. Its pneumatic tool department has taken some good contracts recently.

The Lidgerwood Mfg. Co. says current orders for its specialties, particularly hoisting engines, show quite an increase. The company is still undecided as to whether or not to go ahead with its proposed $2,000,000 plant in Newark, N. J. In the meantime its present plant is kept exceptionally busy filling new orders.

The A. & F. Brown Co. says its volume of business in power transmitting machinery is growing larger, with new specifications being heard from oftener than for several months past.

The American Woodworking Machinery Co. says trade in its line is all that could be desired. It finds business gradually improving, with every indication of continuance.

The Crocker-Wheeler Co.'s October trade did not come up to that done by it in September, which was the best month the company had this year. The company expects to close some good contracts during the coming week or so.

M. H. Treadwell Co. booked some good orders for cinder cars during the past month. Its crane trade has been more active recently.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of Their Wants:—

G. F. Westcott & Co., Buffalo, N. Y., have been incorporated with a capital of $50,000. Directors are: R. L. Cox, Henry Ginneye and E. C. Robbins.

The Binghamton Boiler Compound Co., Binghamton, N. Y., has been incorporated with a capital of $60,000.

The Phœnix Iron Works, Winona, Minn., have been incorporated with a capital of $10,000. Incorporators are: George A. Polley, Frank J. Brom, Albert A. Brandt and Charles Bergler, all of Winona.

The Johnson-Robinson Machinery Co., St. Louis, Mo., has been incorporated with a capital of $15,000, to do a general wholesale, retail and manufacturing business in machinery, tools and implements.

The Hubbard Foundry & Machine Works, Lynchburg, Va., have been incorporated with a capital of $20,000. Incorporators are: P. C. Hubbard, presdent; C. W. Gooch, vice president; and A. B. Dabney, secretary and treasurer.

The Victor Stoker Co., Cincinnati, O., has been incorporated with a capital of $200,000, and will take over the patents of the Day-Kincaid Stoker Co., covering a device for automatically stoking locomotives. A plant will be erected in Norwood and ultimately will employ about 300 men. H. Fullerton, of the American Stoking Co., New York, will become general manager of the new company, whose promoter is Arthur W. Stem. It is expected that G. F. Dana, of the Dana Mfg. Co., Norwood, will become president. The leading stockholders are: S. F. Dana, William Christie Herron, M. E. Ingalls, L. A. Ault, Frank B. Wiborg, D. T. Williams, Harry Levy, Arthur Stem, B. A. Wallingford Jr., J. H. Day, C. A. Kincaid, J. W. Kincaid, E. P. Harrison, Arthur Espy, L. F. Walters, J. C. McCarty, George F. Dana, Dudley V. Sutphin and George Hoadley.

The J. P. Karns Tunneling Machine Co., Boulder, Colo., has been incorporated with a capital of $1,250,000, to manufacture and sell a new tunneling machine, or dispose of the patent right thereto, and will enter into contracts for driving tunnels, sinking shafts, etc. The directors will be J. P. Karns, S. P. Karns, S. P. DeWolf, Shirley Davis, M. F. Davis and J. R. Belcher.

The H. & A. Lock Co., New York, has been incorporated with a capital of $10,000. Incorporators and directors for the first year are: P. F. Hogan, John H. Blackford Jr., and Jacob Fuchs.

The Ross Machine Mfg. Co., Jamestown, N. Y., has been incorporated with a capital of $10,000, to manufacture machinery. Incorporators are: J. B. Ross, C. H. Walter, W. M. Hoffer, Jamestown, N. Y.

The Waterbury Crucible Co., Waterbury, Conn., has been incorporated with a capital of $50,000. Incorporators are: Levi S. Tenney, Montclair, N. J.; C. A. Kierman, New York, and Edgar B. Seidel, Waterbury.

The National Spiral Fire Escape Co., Amherst, Mass., and New York, has been incorporated with a capital of $500,000. Officers are: President, Dwight W. Palmers, Amherst, Mass.; treasurer and secretary, Robert P. Esty, Amherst, Mass.; directors as above named and Edwin D. March, James F. Page and D. H. Nash.

New Construction:—

Broderick & Quinlan, who will build a boiler plant at Hartford City, Ind., are considering the advisability of erecting a foundry in connection with that plant. The boiler plant is being built under contract with the Commercial Club of that city. The following directors have been elected: A. R.

Weiler, William L. Van Cleve, G. P. Ayres, W. H. Campbell, H. O. Thomas, T. P. Van Winkle, Pierre J. D. Larmoyeux, T. W. Sharpe, J. F. Adamson, Stephen Borden, R. K. Willman, James Fulton and E. E. Cox.

Land has been donated for the plant of the Ft. Worth Iron & Steel Co., Ft. Worth, Tex. Seventy-five acres will be devoted to the plant and 126 acres to the homes of the workmen. The company has elected the following officers: W. K. Fogg, president; F. G. McPeak, vice president; Jack T. Anderson, secretary; and W. H. Edleman, treasurer.

The car and locomotive repairing shops which the Lackawanna railroad is building at Kingsland, N. Y., will be the largest on its system. The locomotive shop will be in one building, including the machine, boiler, smith and erecting shops, but they will be separated by fire walls. The building will be 600 x 126 ft. and the power house will be 181 x 62 ft.

The Golden Foundry & Machine Co., Columbus, Ga., is about to make extensive additions to its plant. The machine shop and foundry will be enlarged and considerable new equipment will be installed.

The Simonson Bros. Mfg. Co., Minneapolis, has begun work on rebuilding its plant, recently destroyed by fire. The new building will be of brick and stone, 86 x 110 ft., three-story, mill construction, having extra strength for heavy machinery.

At a meeting of the board of directors of the Ashland Iron Works, Ashland, Ore., it was decided to rebuild at Ashland on the new site owned by the company. The old plant was burned a few weeks ago.

The United Railroads of San Francisco are about to erect shops where all of their cars and other equipment will be manufactured. The location of these shops has not as yet been given out, but it is presumed they will be at some point between San Francisco and San Jose.

The Field & Shorb Co. will erect a boiler and machine shop at Decatur, Ill. The company is now looking for a site and is being assisted by the Chamber of Commerce.

The S. & W. Railroad Co. has begun the erection of a machine shop near its depot, in Carnegie, Johnson City, Tenn.

The Whitlock Coil Pipe Co. has decided to greatly increase its facilities at Elmwood and Hartford, Conn. Builders have been asked to submit bids for a brick addition of slow burning construction, 200 ft. long by 50 ft. wide, two stories.

The Ohio Valley Steel Foundry Co., Paden City, W. Va., has installed a sheet plant and will not make steel castings in the future. Three hot mills have been installed, and the receiver intends adding three more. There are now under construction two open-hearth furnaces, one of 25-tons capacity and the other of 30 tons. A bar mill will also be built.

The plant of the Canada Car Co., recently incorporated with a capital of $3,000,000, is situated at St. Henri, near Montreal. The site covers about 50 acres, of which seven will be covered by buildings. The buildings will be of steel with outside walls of concrete or brick, covered with gravel roofs, and will be arranged in two groups. The foundations are well under way. The various buildings are as follows: Machine shop, 129 x 70 ft.; brass foundry, 86 x 70 ft.; forge and smith shop, 301 x 70 ft.; gray iron foundry, 215 x 70 ft.; wheel foundry, 215 x 184 ft.; planing mill, 387 x 70 ft.; matching room, 236 x 70 ft.; cabinet, pattern shop and carpenters' department, 236 x 70 ft.; trimmers' and upholsterers' shop, 172 x 70 ft.; freight car erection shop, 301 x 70 ft.; passenger car erection shop, 301 x 70 ft.; wheel and axle and truck and bolster shops, 301 x 70 ft.; passenger car paint shop, 301 x 70 ft.; freight car paint shop, 322 x 70 ft.; store house, 120 x 80 ft.

The Metal Shingle & Siding Co., Ltd., Preston, Ont., whose plant was recently destroyed by fire, will erect new buildings covering a space 90 x 208 ft.

The Chippewa Engine Works, Sault Ste. Marie, Mich., have nearly completed their machine shop and most of the equipment is in place. The company is also building a foundry, which will not be equipped until spring.

The McInnes Steel Co., Ltd., Corry, Pa., is building an addition to its plant, 60 x 100 ft., and installing four steam hammers. The company manufactures hammered tool steel.

The Insurance Stove & Range Co., of Cincinnati, O., is making additions and improvements to its foundry and has installed one Newten patent cupola and a traveling crane made by the Northern Engineering Works.

The Bacon & Collins Supply Co. has secured a building site at Albany, Ga., and will begin the erection of a $25,000 foundry and machine shop at once.

The foundry plant of the Anaconda Copper Mining Co., of Anaconda, Mont., is being improved and enlarged. The plant was formerly known as the Tuttle works.

The Navy Department are planning to add a new foundry to the plant at Washington, D. C., also a fire proof pattern store house and several other new buildings.

The Eaton, Cole & Burnham Co., Bridgeport, Conn., is building an addition to its foundry, 50 x 91 ft., two stories, to be used as a brass foundry.

Harkins & Mahern, proprietors of the Berlin Iron & Brass Foundry, Berlin, N. H., are building an addition to their plant 40 x 50 ft. The first floor will be fitted up as a machine shop and the second floor as a pattern shop and wood working department.

J. V. Wallace, of North Wilkesboro, N. C., is building a new machine shop and foundry.

Messrs. Holmgreen, of San Antonio, Texas, are planning to make an addition to their foundry in the near future, expending from $5,000 to $10,000.

At a meeting of the stockholders of the Burns Boiler & Mfg. Co., of De Pere, Wis., recently, it was decided to make an addition to the foundry.

The Green Foundry & Furnace Co., of Des Moines, Ia., has purchased property adjoining its plant and will increase the size of the foundry.

The Betz Surgical Implement & Cutlery Co. will establish a plant at Hammond, Ind.

Ground has been broken at Bessemer, Ala., for the erection of a plant for the manufacture of stoves, which will be owned and operated by J. R. Day. The capacity of the plant will be 100 stoves per day.

The New Home Sewing Machine Co., Orange, Mass., will rebuild that part of its plant recently destroyed by fire. The building destroyed was originally erected for foundry purposes and was 175 ft. long by 50 ft. wide. Later an extension of 110 ft. was made to the original building. It was in this part of the buildings that the japanning was done and there the fire broke out.

The Graham Nut Co., Pittsburg, announces that its main office is now located at its new warehouse on West Carson street, Pittsburg. The building, which is a five-story brick, 40 x 220 ft., was erected by the Nicola Building Co., of Pittsburg, and is equipped with an electric elevator furnished by Marshall Bros., of Pittsburg. In its warehouse the concern carries very large stocks of nuts, screws, washers, turnbuckles and semi-finished and finished hardened nuts. The company was established in 1874 and its plant was formerly located on South avenue, Allegheny. The new plant is on Neville Island, about five miles below Pittsburg. The new building contains 20 furnaces for heating iron, which are located in the main building, which is 85 x 225 ft. This building also contains 35 bolt and nut making machines, blacksmith shop, packing and shipping rooms. A smaller building, 30 x 225 ft., is used for cutting, threading and tapping nuts and bolts. It is equipped with 20 cutting and threading machines, and automatic nut tapping machinery manufactured by the Acme Machinery Co., Cleveland. The water supply is furnished by a well on the property. The company has eight acres and ex-

pects to erect several other buildings. The plant has excellent railroad facilities.

General Industrial Notes:—

The Peoria Steel & Tube Co., Peoria, Ill., whose plant is nearing completion, will be in the market Dec. 1 with cutlery, tool and spring steel and automatic bench vises.

The Carpenter Steel Co., Trenton, N. J., which has been in the hands of a receiver, has been formally dissolved and articles of incorporation reorganizing the company have been filed with the Secretary of State of New Jersey. The new company has a capital stock of $1,200,000. Incorporators are: W. B. Kinhardt, of Bernardsville, N. J.; Robert E. Jennings, Jersey City; and Frederick J. Faulks, Elizabeth, N. J.

The Warwick Iron Co.'s blast furnace at Pottstown, Pa., which has been idle for some time, resumed last week. The Topton furnace, Topton, Pa., belonging to the Empire Steel & Iron Co., has also resumed. The Robesonia furnace, Robesonia, Pa., which has been banked for some time, will be ready to resume operations in about three weeks.

The Leighton-Howard Iron Co., East St. Louis, Ill., will increase its working force until about 1,800 men will be employed toward the close of November. The plant was closed down last July.

The Bellefonte furnace, Bellefonte, Pa., which has been idle since early in the summer, was blown in last week. A new lining has been put in the stack.

The Shaw Electric Crane Co., Muskegon, Mich., has closed a contract for a 75-ton electric crane to be sent to St. Petersburg and placed in the arsenal belonging to the Russian Government.

The Vincennes Foundry & Machine Co., Vincennes, Ind., is the name of a new concern that will supplant the Clark & Buck foundry of that city. The old foundry has been improved and will be equipped with considerable new machinery.

The Parkhurst Boiler Co.'s plant at Oswego, N. Y., will be offered for sale Nov. 18 by the trustee in bankruptcy.

Henry F. Bullerman has purchased the interests of the Bercot Bros. in the Central Foundry Co., Ft. Wayne, Ind., and all the stock is now owned by Mr. Bullerman and William C. Walda. It is their intention to reorganize and double the capital stock in the near future.

The American Locomotive Co., a part of whose plant at Schenectady, N. Y., has been closed, will resume with a full force Nov. 14, to complete a large order for the New York Central. The Richmond, Va., plant will also resume and will soon employ about 400 men.

The rail mill and converter at the steel works of the Colorado Fuel & Iron Co., Pueblo, Colo., have resumed operations at full capacity. These departments have been closed for about a week on account of the scarcity of pig iron. The demand for merchant steel of various is unusually heavy and the departments of the merchant mill that have been idle have been placed on double time. The same is true of the rod mill. This company has established a branch office at Oklahoma City, Okla., with L. C. Pond in charge. The district comprises both Oklahoma and Indian Territory.

During the trials of the New York Central electrical locomotive which is being tested by the General Electric Co. near Schenectady, a high speed was attained with a train of eight coaches. In a run without the coaches the locomotive attained a speed of 70 miles an hour, and it was evident that if the third rail stretch had not been so short a much higher rate could have been reached.

The Boynton Scale & Pump Co., Toledo, Ia., advises us that there is no truth in the report that that company and the Litchfield Mfg. Co., of Waterloo, Ia., contemplate establishing a plant at Des Moines, Ia. These two companies are entirely separate.

The S. Obermayer Co., Cincinnati, manufacturer of foundry facings and foundry supplies, has secured contract from the United States Navy Yards at New York and Cavite, P. I., for foundry facings and foundry supplies to be used during the coming year.

The Virginia Bridge & Iron Co., of Roanoke, Va., has purchased at $200,000 the plant of the Carolina Steel Bridge & Construction Co., manufacturer of bridges, structural steel for buildings, etc., which will be operated in connection with the company's plant at Roanoke.

The Monarch Typewriter Co. has begun operations at its new plant at Syracuse, N. Y., and has placed on the market its new visible typewriter. The plant has a capacity of 150 machines per day and it will be operated in full as soon as conditions permit.

James A. McDaniel, proprietor of the Buckeye Foundry, St. Paul, Minn., will not rebuild the foundry which was destroyed by fire some time ago, but will carry on his business in connection with the Charles A. Stickney foundry, where he will do his work for a year at least.

The Bernville Foundry & Machine Shops, Bernville, Pa., have been sold to William J. Harpel. The machine shop is three stories, 40 x 60 ft., with a foundry one story, 30 x 60 ft.

Henry Romunder, of Newark, N. J., has established at Milwaukee a plant for the manufacture of street cars. The company will build cars for electric railways under patents held by Mr. Romunder, the chief features of which are steel body frames, turtle back roof, bent glass windows and new ventilation methods.

Jensen Bros. have announced that they will start up their rolling mill at Oxford, N. J., with 200 men on Nov. 14. The plant has been idle for two years.

The foundry in connection with the shops of the Washington Tool Co., Owatonna, Minn., has been leased by W. J. Felton and G. J. Kaplan, and it is announced that the Washington Tool Co. will open its shops this week.

The Myers Adjustable Horse Shoe Co., Louisville, Ky., recently incorporated, has placed the first lot of its product on the market. The company manufactures an adjustable shoe invented by J. M. Myers. The shoe proper is made of drop forge steel, like the ordinary shoe, and the improvement is in the calks which are removable or renewable when worn out. The removable calk is said to be especially convenient to enable horses to travel over asphalt or icy pavements.

The Globe Machine Works and the Penn Foundry & Machine Co., of Frankford, Philadelphia, have been consolidated and will carry on business under the firm name of the Globe Machine & Foundry Co. The firm is composed of Charles Denn, William A. Denn, Walter G. Denn and Jas. Conley.

The employes of the Pennsylvania Railroad Co. have tested one of the new cupolas in the foundry at South Altoona, and on Oct. 17 they started up a fire in the cupola, ran off a heat and made a number of souvenir castings.

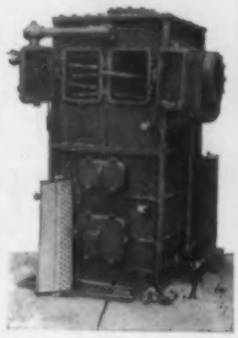
The Vancouver Pipe & Foundry Co., of Vancouver, B. C., has been organized to take over the foundry business of Wharton & Grey, of that city. The company has a capital of $10,000.

The stockholders of the Trimblin Engine & Foundry Co. have decided to accept the offer made by the residents of Avonmore, Pa., by which offer the company is to receive a building site and the citizens are to subscribe for $10,000 worth of stock. In accepting this the company agrees to locate its plant at this point.

The importation of iron ore from Daiquiri, Cuba, last week, was unusually large. Five steamers arrived with cargoes for the Maryland Steel Co. The combined cargoes amounted to about 25,000 tons. This is a record that has not been exceeded in several years.

Creditors of the Marietta Sheet Steel & Tin Plate Co., Marietta, O., have agreed to accept 80 percent on their claims. The plant may be again placed in operation.

COCHRANE HEATERS



If you are going to run your main engines condensing, whether you use reciprocating engines or turbines, there are a number of reasons why you should use Cochrane Heaters in preference to closed heaters.

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Take for example a 1,000 H. P. boiler plant. (If your plant is smaller, say one-half the size, you can divide the results given below by two, or if it is twice as large, multiply the results by two, etc.) Let us suppose that you will average only ten hours per day, that only 8 per cent of the steam made by your boilers is required for the auxiliaries (boiler feed pump, fan engine, condenser pump, service pump, etc.) and that the boiler feed supply will be taken from the hot well at a temperature of 90° F.

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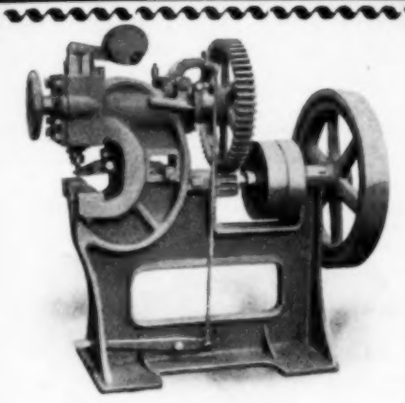

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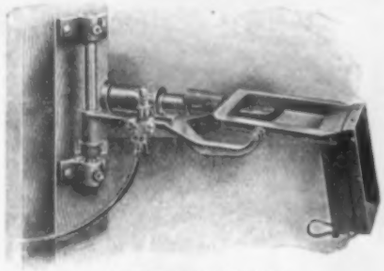

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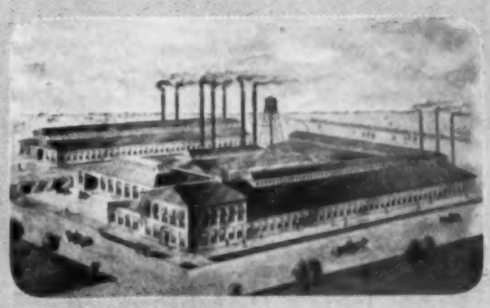

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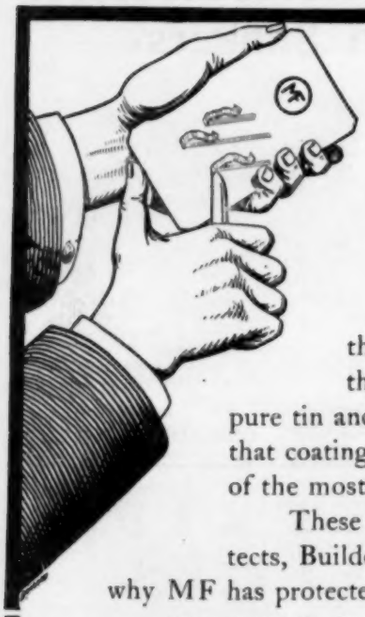

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